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ABSTRACT

Presented is the fourth year report of a 4-year longitudinal study comparing effectiveness of seven preschool programs for deaf children. Schools are seen to emphasize either an oral-aural, Rochester (Oral-aural plus finger spelling), or total communication method of instruction. Included in the report are a brief review of literature on educational programs for the deaf, summaries of earlier yearly reports, descriptions of the programs and subjects studied, project findings, and appendixes (such as a classroom observation schedule). Among findings reported are: that Ss' scores on the Illinois Test of Psycholinguistic Abilities (ITPA) were almost identical to the scores of normal hearing children; that Ss' scores on the Metropolitan Achievement Tests Primer Battery were equal to those of hearing children in reading and were lower in arithmetic; that scores on a Receptive Communication scale showed sound alone to be the least efficient communication mode (44 percent) rising to 88 percent when speechreading, fingerspelling, and signs were added; that improved scores on a test for understanding the printed word (76 percent as compared to 56 percent in 1973 and 38 percent in 1972) reflected increasing emphasis on the teaching of reading; and that deaf children who have been "mainstreamed" do not differ in intelligence, reading, arithmetic achievement, ITPA scores, or overall communication abilities. (LS)

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EVALUATION OF PROGRAMS FOR HEARING IMPAIRED CHILDREN: Report of 1973-74

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December 1974

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RESEARCH, DEVELOPMENT AND DEMONSTRATION CENTER IN EDUCATION OF HANDICAPPED CHILDREN

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The University of Minnesota Research, Development and Demonstration Center in Education of Handicapped Children has been established to concentrate on intervention strategies and materials which develop and improve language and communication skills in young handicapped children.

The long term objective of the Center is to improve the language and communication abilities of handicapped children by means of identification of linguistically and potentially linguistically handicapped children, development and evaluation of intervention strategies with young handicapped children and dissemination of findings and products of benefit to young handicapped children.

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Chapter 1

Summary

The present report covers data gathered during the 1973-74 academic year on seven preschool programs for the deaf. Planning for the project began in 1969 and data were first gathered in 1970-71. Four years of longitudinal data have now been collected. The programs involved represent a diversity of educational philosophies and methodologies. A complete report, covering work from 1969 to 1974 is projected for dissemination late in 1975. Analysis of results to date has produced the following:

1. The overall scores of subjects on the five visual-motor subtests of the Illinois Test of Psycholinguistic Abilities (ITPA) in spring of 1972 (179.96), 1973 (180.03) and 1974 (180.65) were almost identical to the norms established for children with normal hearing (180.00), suggesting essentially normal visual motor functioning for the deaf children in the study.
2. On all five subtests scores remained stable from 1972 to 1973 to 1974.
3. On one subtest, Manual Expression, deaf children evidenced a superiority relative to hearing norms in 1972, 1973 and 1974, suggesting that deaf children may develop superior skills in this area, at least up to age eight, the age of the oldest children in the study in 1974.
4. Scores on the ITPA were influenced by the amount of structure

in a program, with those in more structured programs scoring higher. However, children in less structured programs still scored within the normal range.

5. Scores of deaf subjects on the Metropolitan Achievement Tests (MAT) Primer Battery were equal to the standardization scores of hearing children of equivalent age in Reading and were lower in Arithmetic. In 1973 scores of the deaf subjects were superior on Reading subtests of the Metropolitan Readiness Tests and equal on the Arithmetic subtests.
6. In all programs, with the possible exception of Maryland, Arithmetic achievement is lower than would be predicted on the basis of the children's potential. Programs appear to give relatively less emphasis to Arithmetic than to other areas.
7. Most programs have provided children with technical skills necessary for success in pre-reading and reading tasks. As the children mature and mastery of English plays an increasing role in the reading process, the reading scores of the children appear to fall behind those of the hearing. This trend is apparent by ages seven and eight. Programs have not yet reached this level.
8. Children from programs with major emphasis on the development on articulation skills, socialization, and parent adjustment continue from the beginning to score below children from programs which have a cognitive academic emphasis

along with the aforementioned emphases. Unlike the ITPA, even after children enter the primary grades there is no evidence that they will close the gap. If anything the differences increase, suggesting the lack of early cognitive academic training may continue to be felt throughout the education of a deaf child.

9. Results of testing on the Receptive Communication Scale reveal that:
   a) For the four "person-to-person" modes of communication, the least efficient mode was Sound Alone (44%). Performance increased with the addition of each component, rising to 68% with the addition of Speechreading, 75% with Fingerspelling and 88% with Signs. This represents the same order of difficulty reported in 1972 and 1973.
   b) The mean score for understanding of the Printed Word was 76% as compared to 56% in 1973 and 38% in 1972. This category represents the greatest improvement in efficiency over the period and reflects the increasing emphasis of all programs in the teaching of reading. Again children from non-academic preschools do relatively poorly in this area, even after being introduced to reading instruction. Patterns of scores suggest complex interactions beyond oral-manual considerations. For example, children from one program with an acoupedic, or strong auditory emphasis, scored 58% for sound alone but only increased to 67% with the addition of speech-

reading. Children in another program with a relatively weak auditory program but a strong visual one only scored at 35% for sound alone but increased to 83% with the addition of speechreading. A third program, with apparently a more well-balanced auditory-visual component than the above two improved from 53% for sound alone to 90% for sound and speechreading. The addition of fingerspelling raised the scores of children in this program to 97%.

10. The Receptive Communication Scale was expanded to test comprehension of Negation, Passive Voice and Verb Tense. The results indicated that:

    a) The children tended to ignore negative markers and processed negative sentences incorrectly as positive more frequently than as negatives.

    b) The children tended to ignore the passive marker, "by," and processed passive sentences incorrectly as active more frequently than as passive.

    c) Correct responding for verb tenses was 39%, close to the chance level of 33%.

    d) For negatives and passives children performed relatively better when the task was presented via the printed word.

    The above results, consistent with other investigations, lead the authors to conclude:

    a) In the case of negatives and passives, not only do deaf children process the message incorrectly but they tend to abstract the opposite meaning (positive instead of negative, active instead of passive) from what was intended.

b) Regardless of mode of communication, verb tenses are not clearly differentiated consistently.

c) Children tend to encounter passives, negatives and verb tense constructions only in print. They do not appear to be part of the daily classroom or home experience.

d) Activities (exercises, practices, drills etc.) must be developed by which children have experience with such English structures in their day-to-day person-to-person interactions involving oral-aural-manual communication.

11. Results of testing on the Expressive Communication Scale are being analyzed with regard to semantic content, intelligibility, linguistic structure, and understandability as a function of the hearing status of raters. This area is the most complex section of the entire study. Results will be published in detail in a separate monograph. Results in general reveal that:

a) Raters correctly identified 37% of the expressive attempts.

b) By groups, Interpreters achieved 56.66% correct, while Deaf Adults and hearing Graduate Students achieved 32.21% and 19.54% respectively.

c) Scores for individual children ranged from 8% to 57%.

12. In articulation, children in two programs scored significantly higher than those in the other five for the second year. They were also higher in the Sound Alone subtest of the Receptive Communication Scale. Because children in the two programs show little similarity in Reading Achievement with achievement, overall expressive communication, receptive communication ITPA scores or methodology (one is oral-aural and one is combined), the authors conclude that articulation of isolated words and use of residual hearing relate purely to the emphasis on auditory training and articulation given by a program and are not related to other factors, including the use of manual communication.
13. Despite statistical differences on average scores between programs in articulation, the range of scores within programs is great. Each program has children whose attempts to articulate are almost completely unintelligible.
14. On the tests of Cognitive Development no differences were found on classification, conservation, and seriation scores between programs. In 1973 children involved in a Piagetian based program had scored higher than children in other programs. By 1974 children in all other programs were functioning at similar levels. There is no evidence that the early training provided any lasting benefits or transferred to other areas measured in the study.
15. Classroom observations showed great variation in factors such as Classroom Organization, Structuring of Program,

Encouraging Speech and Language Developing, and Reacting to Children's Needs. Relative program ranks were consistent from 1973 to 1974. Relative rank in classroom observation scores appeared to correspond in ratings of overall program effectiveness.

16. In child to child communication the most frequent mode of communication was Sign, followed by Oral and Combined Oral-Manual, the same order which was rated in 1973. The use of Fingerspelling increases as the children mature while Gestures decline, except in one oral-aural program where they have increased.

17. In child to teacher communication the most commonly employed mode is Sign, followed by Oral and Combined; i.e., the same order of frequency rated for child-child communication. Similarly the use of Fingerspelling is increasing and reliance on Gestures is decreasing, again with the exception of one oral-aural program.

18. The teacher to child communication most frequently used is Oral, followed by Combined and Sign. Teachers are increasingly more consistent in following the expressed philosophy of a program (Oral-Aural, Rochester, or Total Communication). There are no "pure" programs. Teachers in programs which are committed to simultaneous oral-manual instruction frequently speak without signing or fingerspelling. Conversely teachers devoted to oral-only instructions tend to gesture to such an extent that their mode can only be described as oral-gestural.

19. Results suggest that limitations to oral-only instruction restrict the amount of communication in a classroom and force the development, unconscious or otherwise, of an inefficient gestural system.

20. Although attitudinal differences exist between parents of children in different programs, they are not as great as in the beginning of the study. Differences tend to center around the training and desirability of manual communication, hearing status of friends of their children when they become adults, and the possibility of attending school with the hearing. Responses of Oral program parents to questions and concepts concerned with manual communication have changed from negative to neutral to positive as the children have matured. They still tend to regard such concepts less positively than parents of children in combined programs.

21. Children who have been integrated or "mainstreamed" do not differ in intelligence, reading, arithmetic achievement, ITPA scores, or overall communication abilities. They tend to have more hearing and better speech. Other factors appear to be minor. Very little accommodation has been made to the "mainstreamed" students. "Mainstreamed" students had better speech before they were placed in regular classrooms. Children do not speak better because they are integrated; they are integrated because they speak better.

Chapter 2

Introduction

The present report marks the completion of the fifth year of work, and the fourth year of data gathering, of a five year project developed to assess the effectiveness of preschool programs for deaf children. The project is addressed to many of the questions in education of the deaf which have been answered in the past mainly on the basis of rhetoric, emotion and vituperation. An unhealthy fixation on such issues as "oralism" vs. "manualism," residential vs. day settings, and parent training vs. child training has served to freeze education of the deaf into a pedagogical dark age relatively unresponsive to issues of broader import to education and seemingly unaware that education of the deaf is a legitimate subset of general education.

It cannot be denied that the issues of methodology and placement are important, even critical. Educators of the deaf cannot be faulted for considering and discussing these issues. They stand condemned, however, by virtue of the fact that, after 200 years of discussion, there is a disheartening lack of supportive evidence on which to make decisions. This is especially true in the preschool area where research has tended to fall into two categories. The first category is represented by comparative studies between programs conducted to fulfill dissertation requirements for a doctoral degree (Craig, 1964; Phillips, 1963). Such investigations can be excellent but by design they are short term in nature and are not designed to continue on a longitudinal basis. The second category is represented by the work of people evaluating the effectiveness of programs with which they happen to be affiliated (Hester, 1963; McCroskey, 1968; Simmons, 1962; Craig & Craig and DiJohnson, 1972; McConnell & Horton, 1970). In many cases these reports are basically explanations and justifications of certain procedures. Such evaluations serve a useful purpose, but they are usually limited to one program and raise a number of problems, the greatest of which is the difficulty of assignment and treatment of children, that is, effectively accommodating experimental and control subjects within the same program.

A major incentive for the present project lies in the belief that there are extremely important and complex issues in the education of preschool deaf children which should be investigated. Of equal importance is the hope that the present project will motivate other researchers to bring their talents to bear on issues of practical importance in the education of young deaf children. It must be reported that very little such work is being undertaken at present.

Review of Literature

A review of the results of educational programs for the deaf presents a dismal picture. In spite of the existence of a deaf Ph.D. or lawyer, who more often than not has a moderate hearing loss or is adventitiously deaf, it is an uncontestable fact that the majority of the products of our systems are shamefully undereducated. Intellectually normal deaf adolescents and adults in North America and Europe are unable to read at the fifth grade level (Furth, 1966; Norden, 1970; Wrightstone, Aranow & Moskowitz, 1963), lack basic linguistic skills in the language of the normally hearing community (Moores, 1970a; Simmons, 1962; Tervoort & Verbeck, 1967), and are incapable of receiving and expressing oral communication on anything but a primitive level (Montgomery, 1966; Report of the Chief Medical Officer of the British Department of Education and Services, 1964).

According to information presented in the Annual Directory of Services of the American Annals of the Deaf, the number of deaf children served by preschool programs has risen tremendously in the past ten years (Doctor, 1963; Craig & Craig, 1973) to the point where probably a majority of deaf children in urban areas are identified and receive some treatment prior to the traditional age of school entrance. Unfortunate exceptions are Chicano, Black and Indian children, who are less frequently diagnosed and served at earlier ages.

Although programs have proliferated, those interested in the development of new programs, or the modification of ongoing ones, quickly discover that almost no educational guidelines exist for effective preschool programs for the deaf. Studies that have been conducted to evaluate the effectiveness of preschool programs have reported either that no differences existed between deaf children receiving preschool training and deaf children not receiving preschool training (McCroskey, 1968; Vernon & Koh, 1970), or that initial differences existing between the two groups have dissipated by age nine (Craig, 1964; Phillips, 1963).

Except for the report of the results of the first three years of data gathering for the present study (Moores & McIntyre, 1971; Moores, McIntyre, & Weiss, 1972; Moores, Weiss & Goodwin, 1973), the only direct comparison of methodology was conducted by Quigley (1969) who reported that preschool children taught by the Rochester Method (the simultaneous use of speech and fingerspelling) were superior to children taught by the Oral-Only approach in measures of speechreading, reading, and written language. Recent research on the relative superiority of deaf children of deaf parents has had a great and growing impact on the field. These findings suggest that deaf children of deaf parents tend to be better adjusted, to achieve academically at a higher level, to have better language abilities, and to have equivalent speech development (Best, 1972; Meadow, 1967; Quigley & Frisina, 1961; Stevenson, 1964; Stuckless & Birch, 1966; Vernon & Koh, 1970) in comparison to deaf children of hearing parents. Of great importance is the evidence that deaf children of deaf parents increase their relative advantage with age so that by late adolescence their superiority is much more pronounced.

In view of the above findings in favor of deaf children of deaf parents (which may have been the result of an exposure to signs from birth), and because studies of Oral-Only programs have shown no differences or only temporary effects, it has been argued that many preschool programs have failed because they have been restricted to Oral-Only instruction (Vernon & Koh, 1971). Perhaps, then, it has been argued, the addition of manual communication would improve results. Such reasoning has led to the development of many recent preschool programs utilizing a system named Total Communication which involves the use of signs, fingerspelling, and oral-aural communication.

Although the evidence of the superiority of deaf children of deaf parents is substantial, it does not necessarily follow that the use of manual communication in preschool programs will produce better results. At present, no data exist, again excepting the present study, on the comparative efficiency of the use of Total Communication as opposed to either an Oral-Only method or the Rochester Method. For a comprehensive treatment of research on manual communication, the reader is referred to reviews by Moores (1971, 1974).

The lack of data may be traced to two primary concerns. First, the extreme difficulty of evaluating the effectiveness of preschool programs is compounded by the added dimension of deafness. Second, and perhaps an even more inhibiting factor, is the highly emotional nature of the question of methodology with young deaf children. In a report to the Secretary of Health, Education and Welfare (Babbidge, 1965), it was noted that for more than 100 years emotion has served as a substitute for research in the education of the deaf. Some educators firmly believe that the use of any kind of manual communication will prevent the development of speech and language and result in a mute subculture. Others believe, just as firmly, that depriving a deaf child of manual communication will cause irreparable linguistic, educational, and emotional damage. Given such a climate, most researchers prefer to investigate other questions.

In the authors' opinion, neither concern should stand in the way of a search for objective analysis. Educational decisions must be made daily, and if no information exists, these decisions will continue to be made on the basis of emotion and other less desirable factors.

The rationale for this study is based on a modification of Cronbach's (1957) Characteristics by Treatment Interaction Model. The model is based on the thesis that when results of educational research consist entirely of comparisons between groups they are of limited value. Such investigations may be neat and produce results but they frequently mask important interactions between individuals and different types of treatments or educational programs. The search should not be for the "best" method for all children but rather for the preferred method for a particular child at a particular stage. (For a more detailed explanation of this rationale see Moores, 1970b.)

During the first year of the study (9/69 - 8/70) formal commitments were given and received from participating programs following visitations and/or discussions with administrators and personnel. The majority of time during the first year was spent in the development and testing of assessment techniques. Testing was facilitated by the proximity and cooperation of two preschool programs for the hearing impaired in the Minneapolis-St. Paul area.

In addition, an advisory committee of qualified professionals was established and convened in November, 1969. This committee represented several viewpoints and disciplines, and was deemed essential for inputing technical assistance and maintaining objectivity. The committee is as follows:

T. Walter Carlin, Ph.D.
Director
Sir Alexander Ewing Clinic
Ithica College
Ithica, New York

*Diane Castle, Ph.D.
Assistant Professor of Audiology
State University College
Geneseo, New York

Eric Lenneberg, Ph.D.
Professor of Psychology
Cornell University
Ithica, New York

McCay Vernon, Ph.D.
Professor of Psychology
Maryland State College
Westminster, Maryland

1970-71 Report: Evaluation of Programs for Hearing Impaired Children (EPHIC)

Researchers visited each of the seven programs involved for several days in the fall of 1970. Leiter International Performance Scales were administered, background data were collected from the school records and classroom observations were made. All programs were revisited in the spring of 1971. At this time researchers administered five visual-motor subtests of the Illinois Test of Psycholinguistic Abilities, re-examined pupil records, and administered measures of communication and language ability. Full descriptions of procedures are contained in the report. The following seven programs each considered a strong representative of a particular preschool model, participated in these activities:

American School for the Deaf
West Hartford, Connecticut

Bill Wilkerson Hearing & Speech Center
Nashville, Tennessee

*Now Director of the Infant Training Program of the Rochester School for the Deaf.

Callier Hearing & Speech Center
Dallas, Texas

Minneapolis Public School Program
Minneapolis, Minnesota

New Mexico School for the Deaf
Santa Fe and Albuquerque, New Mexico

Rochester School for the Deaf
Rochester, New York

St. Paul Public School Program
St. Paul, Minnesota

1970-71 EPHIC Major Results

1. On modifications of five visual-motor subtests of the Illinois Test of Psycholinguistic Abilities (ITPA), the children as a group scored slightly below the norm for hearing children. Regardless of program, methodology or etiology, a definite pattern of scoring occurred across subtests. The children were above the norms on Visual Sequential Memory and Manual Expression and below on Visual Reception and Visual Association. Visual Closure subtest scores revealed a substantial retardation, perhaps due to the timed nature of the test.

2. No significant differences (defined as $p < .01$) were found between Combined (oral-manual) and Oral programs on the ITPA. Children in structured programs scored higher than those in unstructured programs. When grouped by etiology, children with hereditary deafness were superior to other classifications.

3. The most common mode of communication between children was through gestures, regardless of the official philosophy of the program. The only exception was New Mexico, where signs were most common.

4. Communication from child to teacher most commonly followed the Oral-Aural mode, closely followed by gestures. Gestures were most frequent in Minneapolis, signs in New Mexico and the American School, and fingerspelling in St. Paul.

5. Communication from teacher to child most frequently was Oral Aural, accompanied by fingerspelling in Rochester and St. Paul and by signs and fingerspelling in New Mexico. Teachers in Oral-Only programs used gestures as much as, or more than, teachers in combined programs.

6. The mean IQ score of the subjects, as measured by the Leiter International Performance Scale, was 113.7. Children in structured programs tended to have higher scores than those in unstructured programs.

7. Speech and speechreading abilities of those children around chronological age four were extremely difficult to assess. Ratings of children's attempts at articulation showed no significant differences between oral and combined or structured and unstructured programs.

8. No differences were found in speechreading in the oral-combined and structured-unstructured comparisons.

9. Semantic differential ratings revealed no differences between parents of children in combined and oral programs in reaction to concepts Hearing Aid, Hearing Impaired, Speech and Auditory Training. Parents of the oral group were more negative toward Speechreading, Sign Language and Fingerspelling and more positive toward Deafness and Integration of a Deaf Child into a Hearing Class.

1971-72 Report: Evaluation of Programs for Hearing Impaired Children (EPHIC)

The project followed the same children in each program with the exception of the Bill Wilkerson Hearing and Speech Center, which withdrew, and the Maryland School for the Deaf, which was added to the study in fall, 1971. Children in all programs were tested in spring 1972. In addition to adminstration of the tests given in 1971, children were measured on newly developed receptive communication and articulation scales. Children about age 6 were assessed in the area of academic readiness and academic achievement.

1971-72 EPHIC Major Results

1. The overall scores of subjects on the five visual-motor subtests of the Illinois Test of Psycholinguistic Abilities (ITPA) were almost identical to the norms established for children with normal hearing, suggesting essentially normal visual-motor functioning for deaf children.

2. On four of the five subtests, there was evidence of regression toward the mean, i.e., scores in 1972 tended to be closer to the hearing norm of 36 than did scores in 1971.

3. On one subtest, Manual Expression, the relative superiority of deaf children increased from 1971 to 1972 suggesting that deaf children may develop superior skills in this area.

4. Scores on the ITPA were influenced by the amount of structure in a program with those children in more structured programs scoring higher.

5. ITPA scores correlated with teachers' ratings of pupils making the most and least progress.

6. A Receptive Communication Scale was developed to assess five modes of receptive communication: 1) Sound Alone, 2) Printed Word, 3) Sound plus Speechreading, 4) Sound and Speechreading plus Fingerspelling, and 5) Sound and Speechreading plus Signs.

7. Results of testing on the Receptive Communication Scale reveal that:

a) The least efficient mode was Sound Alone (34%). Performance increased with the addition of each component, increasing to 56% with the addition of speechreading, 61% with fingerspelling and 71% with signs. The mean score on Reception of the Printed Word was 38%.

b) Children with the highest scores in reception of Sound plus Speechreading were from programs (St. Paul and New Mexico) using manual and oral communication from the time the children started their education, suggesting that instead of inhibiting the reception of spoken language, early manual communication probably facilitates it.

8. Scores on the Receptive Communication Scale were not significantly correlated to hearing loss for children in combined programs (.24, not significant).

9. Significant differences were found between children in the lower quartile in hearing from oral programs, and children in the upper quartile in hearing in combined programs on receptive communication. No other significant differences were found.

a) The data suggest that early manual communication does not hinder children with substantial residual hearing.

b) The data suggest that lack of manual communication retards receptive ability of children with a minimal amount of residual hearing.

10. No patterns can be found in articulation scores between programs. Whether or not children had Oral-Manual or Oral-Only instruction at the beginning does not appear to be a factor. Success in this area appears to be more a function of program priorities. Children from combined programs represent two of the top three programs in this category.

11. Classroom observations showed great variation in variables such as Classroom Organization, Discipline and Classroom Relationships, Program Structure and Reacting to Pupil Needs. Programs which scored high in these ratings tended to have children who scored well on all instruments, indicating that classroom structure and organization perhaps deserve consideration equal to that currently given methodology.

12. In child to child communication, the children rely primarily on gestures or signs. Gestures are more common in Oral-Only programs.

13. In child to teacher communication the most common mode of communication is Oral-Aural. Children in Oral-Only programs use gestures next most frequently and those in combined programs use signs.

14. In teacher to child communication, most teachers in combined programs did not consistently use signed/spelled English in coordination with the spoken word. The signed or spelled element frequently represented key words and not full sentences.

15. Teachers in Oral-Only programs gestured extensively. It is unclear if they are aware of the extent to which they are conveying information through manual means.

16. Parents of children in Oral-Only programs see the main function of programs for the hearing impaired to be the development of speech and speechreading skills. They react negatively toward concepts such as Sign Language and Fingerspelling and positively toward the concept Integration of a Deaf Child into a Hearing Class.

17. Parents of children in combined Oral-Manual programs see the main function of programs to be the provision of appropriate instruction in academic skills, i.e., reading, language and writing. They perceive programs as actually combined Oral-Manual, rating as equally positive Speech, Sign Language, Speech Reading, Auditory Training, Fingerspelling and Hearing Aid.

18. The following common elements were identified in programs with children scoring relatively well across all measures:

a) A heavy cognitive/academic component with emphasis on pre-reading and readiness activities from the beginning.

b) Exposure to both oral and manual communication from time of entrance into the program.

c) Well-structured and organized classroom activities.

d) Auditory training activities as integral parts of the school day.

e) Parents who view the program as combined oral-manual and not oral only or manual only.

1972-73 Report: Evaluation of Programs for Hearing Impaired Children (EPHIC)

The project followed the same children in each program who had been tested in 1971-72. All children were tested in spring 1973. In addition to administration of the tests given in 1972, children were administered tests of cognitive functioning, expressive communication, the Metropolitan Readiness Tests and the Matching Familiar Figures Test (MFF).

1972-73 EPHIC Major Results

1. The overall scores of subjects on the five visual-motor subtests of the Illinois Test of Psycholinguistic Abilities (ITPA) in spring of 1972 (179.96) and 1973 (180.03) were almost identical to the norms established for children with normal hearing (180.00), suggesting essentially normal visual-motor functioning for the deaf children in the study.

2. On all five of the subtests, scores remained stable from 1972 to 1973.

3. On one test, Manual Expression, deaf children evidenced a superiority relative to hearing norms both in 1972 and 1973, suggesting that deaf children may develop superior skills in this area.

4. Scores on the ITPA were influenced by the amount of structure in a program, with those in more structured programs scoring higher.

5. ITPA scores correlated with teachers' ratings of pupils making the most and least progress and with scores on receptive communication.

6. The scores of the deaf subjects were higher than the normal standardization population on the sum of four subtests of the Metro-

politan Readiness Tests which were administered (Matching, Alphabet, Numbers, Copying). Deaf students were statistically superior on the Matching and Alphabet subtests and inferior on the Numbers subtest. Success on the Alphabet subtest was related to a program's use of manual communication.

7. The results on the Metropolitan Readiness Tests indicate that the programs have provided children with technical skills necessary for success in the first grade.

8. Results from one program raise the possibility that integration of deaf children with younger hearing children, rather than with age mates, might tend to dissipate earlier academic gains.

9. The Receptive Communication Scale originally used in 1972 to assess five modes of receptive communication: 1) Sound Alone, 2) Printed Word, 3) Sound plus Speechreading, 4) Sound and Speechreading plus Fingerspelling and 5) Sound and Speechreading plus Signs, was expanded to incorporate greater grammatical complexity.

10. Results of testing on the Receptive Communication Scale reveal that:

a) The least efficient mode was Sound Alone (43%). Performance increased with the addition of each component, rising to 63% with the addition of speechreading, 72% with fingerspelling and 86% with signs. The mean score for reception of the Printed Word was 56%. This represents the same order of difficulty reported in 1972.

b) The total per cent correct across programs increased from 50% in 1972 to 62% in 1973. The range of scores across programs decreased from 1972 (43% to 60%) to 1973 (59% to 69%).

11. Scores on the Receptive Communication Scale were significantly correlated to hearing loss for children in Oral-Only programs (.61, $p < .01$) but not for children in Combined programs (.09, not significant).

12. Results of testing on the revised Expressive Communication Scale reveal that:

a) Raters correctly identified 37% of the expressive attempts for 69 children.

b) By groups, Interpreters achieved 47% correct, while Deaf Adults and Graduate Students achieved 35% and 32% correct respectively.

13. Comparisons by _t_ test show the New Mexico School for the Deaf and the Maryland School for the Deaf to be significantly superior ($p < .01$) to the Rochester School for the Deaf and the Minneapolis Program. Percent correct for individual children ranged from 9% to 65%.

14. In articulation scores, children in two programs performed significantly higher than those in the other five. The same two programs are superior on the Sound Alone subtest of the Receptive Communication Test. No explanation of this situation is available at present. One program is Oral-Aural and one is Total Communication.

15. Despite statistical differences on average scores between programs in articulation the range of scores within programs is similar. Each program has children whose articulation is almost completely unintelligible.

16. Three Cognitive Development Measures, based on Piagetian concepts, were developed and administered to assess classification, conservation and seriation. Children in the program which has based much of its curriculum on Piaget's theory were superior on this battery. There were some correlations with scores in the Metropolitan Readiness Tests.

17. The relationship between functioning on classification, conservation and seriation tasks to other types of functioning being assessed is unclear. For example, children in the program scoring highest in the Cognitive Development Measures were lowest in the Illinois Test of Psycholinguistic Abilities visual-motor subtests. Whether or not specific training on conservation, classification and seriation per se transfers to other behaviors is worthy of investigation.

18. On the Matching Familiar Figures Test, no differences were found between programs. Children classified as "impulsive" did relatively poorly only on tests which were timed (Visual Closure on the ITPA, Copying and Matching on the MRT), suggesting they employ inappropriate strategies under the constraints of time.

19. Classroom observations showed great variation in variables such as Classroom Organization, Structuring Program, and Encouraging Speech and Language Development. There were large differences from the relative program ranks in 1972. Changes in relative rank in classroom observation scores appeared to correspond with changes in ratings of overall program effectiveness.

20. In child to child communication, the most common mode of

communication was sign. Oral-Aural and combined Oral-Manual communication were also frequently observed. Gestures continue to be more common in Oral-Only and Rochester Method programs. Of the two programs using Oral-Aural Communication most frequently, one is a Total Communication program and one is Oral-Aural.

21. In child to teacher communication the most common mode of communication is Oral-Aural, followed by sign. Gestures continue to be employed more frequently in Oral-Only programs.

22. Teacher to child communication most frequently is Oral-Aural followed by sign. Teachers appear to be more consistent in following the expressed philosophy (Rochester Method, Total Communication, Oral-Aural) of a particular program than in past years. However, teachers in Oral-Only and Rochester Method programs continue to place heavy reliance on gestures.

23. In five of the seven programs consistent communication patterns were observed. In two programs the mode of communication varied as a function of the pair unit involved (child-child, child-teacher or teacher-child).

24. Parents of children in Oral-Only programs have modified their opinions to some degree from 1971 and 1972. In 1972 they saw the main function of programs for the hearing impaired to be the development of speech and speechreading skills. In 1973, they agreed with parents of children in Combined programs that the main function should be the provision of appropriate instruction in academic skills. Responses of Oral program parents toward questions and concepts concerned with manual communication now tend to be neutral rather than negative. They

continue to exhibit much stronger support of educational integration.

25. Three programs were identified which seemed to be most effective across eight major areas assessed in the evaluation.

26. As the project continues, evaluation becomes more and more complex, and individual programs exhibit different patterns of strengths and weaknesses. As noted in the beginning of the project, the final objective is not to identify the best of seven programs to serve as a model, but to identify factors which appear to be of benefit to the development in young children of specific skills or abilities (e.g., grammatical, articulatory, academic, intellectual).

Activities: 1973-74

The project has continued to follow the same children in each program. The Wechsler Intelligence Scale for children (WISC) was administered to each child and background data were gathered in fall, 1973. Programs were revisited in spring, 1974. Children received the Metropolitan Achievement Tests and the same battery of tests as in spring, 1973 with some modification. The Matching Familiar Figures Test and Metropolitan Readiness Tests were dropped from the battery for 1974.

Chapter 3

PROGRAM AND SAMPLE DESCRIPTION

Program Description

The seven participating programs are as follows:

American School for the Deaf
West Hartford, Connecticut

Callier Center for Communication Disorders
Dallas, Texas

Maryland School for the Deaf
Frederick, Maryland

Minneapolis Public School System
Minneapolis, Minnesota

New Mexico School for the Deaf
Albuquerque and Santa Fe, New Mexico

Rochester School for the Deaf
Rochester, New York

St. Paul Public School System
St. Paul, Minnesota

At the onset of the second year of data collection the Bill Wilkerson Hearing and Speech Center withdrew from the evaluation and the Maryland School for the Deaf was added.

Programs were selected to represent a diversity of educational methodologies and philosophies. The authors are aware of differences that exist in the definitions of these varied methods of instruction, especially in reference to the term "Total Communication." However, for purposes of the present study methodologies have been defined as follows:

1. Oral-Aural Method. In this method, the child receives input

through speechreading (lipreading) and amplification of sound, and expresses himself through speech. The use of signs and fingerspelling are not part of the educational process.

2. Rochester Method. This is a combination of the Oral-Aural Method plus fingerspelling. The child receives information through speechreading, amplification and fingerspelling, and expresses himself through speech and fingerspelling. When practiced correctly, the teacher spells every letter of every word in coordination with speech.

3. Total Communication. This approach, also known in this context as the Simultaneous Method, is a combination of the Oral-Aural Method plus fingerspelling and signs. The child receives input through speechreading, amplification, signs and fingerspelling. A proficient teacher will sign in coordination with the spoken word, using spelling to illustrate elements of language for which no signs exist.

Program administrators were not obligated to maintain any particular aspect of their programs for the duration of the research. They were simply requested to continue to provide what they considered to be the most effective program possible for hearing impaired children. This has presented some difficulty in classification because some programs have been in transition from one method or philosophy to another. However, it does enable the investigators to assess the effects of change, e.g., from an Oral to a Total Communication program or from a structured to unstructured format at different age levels. The 1973-74 classifications by method are presented in the following section on Program Outlines.

In order to provide the reader with an account of the activities of children studied in the different programs, each supervising teacher was asked to submit a "sample day" representing a daily schedule typical of that followed by the children. The sample days for each program are presented, unedited, in Appendix A.

Program Outlines

American School for the Deaf

The American School is a public, residential school serving 464 pupils in preschool through 12th grade (342 residential, 122 day students). Twenty-six of the total school population are classified as multiply handicapped. The enrollment age ranges from 2 1/2 to 20 years. The preschool is situated in a building specifically designed for young deaf children. The preschool program was Oral-Aural at the initiation of the project. It has since changed to the Total Communication method of instruction.

Callier Center for Communication Disorders (formerly the Callier Hearing and Speech Center)

The Callier Center is a public day school with an enrollment of 164 pupils in preschool through 3rd grade. There is no minimum age for admission. The five-year-old facility was designed to be a complete functional unit including educational, clinical and research divisions. All children currently involved in this research began training in the Oral-Aural Method. As of the fall and spring of the

1972-73 school year, five children in the sample began instruction in Total Communication classes; since that time, the Callier Center has adopted the Total Communication instructional approach. Currently only three children are continuing in the Oral-Aural Method within their home district schools.

Maryland School for the Deaf

The Maryland School for the Deaf is a public, residential facility serving 378 pupils, 344 residential, and 34 day students in preschool through 12th grade. The minimum age at enrollment is 4 years with a maximum age of 19 years. Housing, dining facilities, gymnasium and classrooms for all the younger children are located in a two story building on the campus. The children at Maryland are being trained via Total Communication.

Children in the Maryland program are the only ones who have not remained in the same nursery and/or preschool program over an extended period of time. All entered the Maryland School for the Deaf in September, 1971. Five had preschool experience at the Easter Seal Society, the Gallaudet College preschool or a private preschool; one had been enrolled in a day care center for the retarded, while one had been involved with the Maryland School for the Deaf parent counseling program.

Minneapolis Public School System

The Minneapolis Public School System is a public day program serving 178 pupils in preschool through 12th grade from the west metropolitan school districts of the Minneapolis/St. Paul area.

The enrollment ages range from under 1 year to 21 years. The majority of the sample attend day classes for the deaf in two of the elementary schools; none remain involved in the parent-oriented preschool program in which the entire sample was originally enrolled. Two of the children have been placed in hearing classes in their home districts, while four others are integrated into the same hearing first grade classroom where they are receiving supplementary instruction from a teacher of the deaf working within the classroom. Most of the Minneapolis children in this project are trained using the Oral-Aural Method, although four children have been placed in total communication classes within the Minneapolis program as of 1974.

New Mexico School for the Deaf

The New Mexico School for the Deaf publically serves 228 pupils in Santa Fe and outlying preschool units. The 153 residential pupils are housed in Santa Fe along with 75 day students in preschool through 12th grade. The enrollment age ranges from 5 to 21 years. The Albuquerque program has 21 day students with enrollment beginning at age 1. The Santa Fe preschool is located in the primary building while the Albuquerque preschool is a self-contained unit. All children in these preschools are instructed via Total Communication.

Rochester School for the Deaf

The Rochester School for the Deaf is a public, residential school enrolling 278 students (108 residential pupils and 170 day pupils) in preschool through 12th grade. The enrollment age ranges from 3 to 19 years. The preschool program at the Rochester School is located in a building specifically designed for young deaf children. This year four children in the sample are involved in primary level classes located in another area of the campus. While the program was employing the Oral-Aural Method of communication at the onset of research, children in this program now receive instruction in the Rochester Method.

St. Paul Public School Program

The St. Paul program is a public day school enrolling 152 pupils from the St. Paul/Minneapolis east metropolitan area in preschool through 12th grade. The enrollment age ranges from under 1 year to 21 years. The preschool is located in five rooms of an elementary school. In 1970-71, all children received training via the Rochester Method. In 1971-72 the children in the project began receiving either Total Communication or Oral-Aural instruction, as decided by the staff. Three children are now integrated into regular classes under the supervision of the St. Paul program.

Selection of Subjects

At present there are 61 children in the project, all of whom have satisfied the following requirements:

1) Birthdate between March 1, 1966 and March 1, 1968;
2) Sensori-neural hearing loss of 70 dB or greater in the better ear across the speech range;
3) Leiter International Performance Scale of 80 or better;
4) Age of onset of hearing loss of two years or younger;
5) No other severe handicap in addition to the hearing loss.

The primary source of pupil information has been cumulative record files. In spring 1974 the files were reviewed and information regarding most recent audiometric data and official confirmation of etiology and age of onset was gathered. This is the first year that quantitative audiograms have been available for all children in the sample.

Complete data has been gathered on the children for four years in all of the programs except for 8 subjects from the Maryland School for the Deaf who entered the study in September, 1971. This year, 11 students either moved to different states or were transferred to other school systems.

Description of Subjects and Program Services

In accordance with the original proposal, the WISC Performance Scale was administered in the fall of 1973. The remainder of test data was gathered from March through May 1974. The order of visits was random except that a program visited first or last in 1972 or 1973 did not fall in the same position in 1974.

The chronological ages of the 61 subjects at the time of testing ranged from 74-91 months, with a mean age of 84.62. WISC Performance Scale IQ scores ranged from 85 to 142 with an overall mean of 110.09.

Audiometric data yielded a mean hearing loss of 98.36 for the sample with a range of 75 dB to 110 dB. As in 1973, 92% of the sample have some type of hearing aid, either their own or one loaned to them by the school. This contrasts to a figure of 85% in the 1970-71 period and 88% for the 1971-72 period.

A summary of the sex, age, IQ and hearing loss by program is available in Table 1. The t-test comparisons on the basis of these factors reveal no significant difference between programs. A more detailed description of the IQ data is found in Chapter 4 of this report.

The breakdown of the sample by etiology and age of onset of hearing loss may be found in Tables 2 and 3. Despite recent medical and diagnostic advances it is interesting to note that the Unknown Etiology category is the largest, accounting for over 1/3 of the sample.

Data in the pupils' cumulative files indicate that by June 1974 8 children (the complete Maryland sample) had attended their present program for three academic years. For the other six programs, 24 children had been enrolled for four years, 23 for four to five years, and 6 for five or more years.

Eighteen pupils are currently living in residential schools; the remaining children attend day classes either in residential schools or speech and hearing centers. The number of class hours of instruction varies from program to program and also within some programs. However, almost all of the children are now judged old enough to attend full day sessions. The average number of hours spent in the classroom for the entire sample is approximately 27 1/2 hours per week, an increase over the past year. The type of student (residential, etc.) and number of instruction hours by programs is presented in Table 4.

Tables 5 and 6 include a description of staff and supportive

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Table 1

Subjects Tested in 1974 by Chronological Age, IQ, Sex and Hearing Loss

	Number of Subjects	Sex		CA Means in Months	WISC Performance IQ Mean	Hearing Loss	
		M	F			Mean	Range
American School for the Deaf	6	5	1	83.17	103.33	97.67	90 - 103
Caller Center for Comm. Disorders	12	8	4	82.83	113.50	95.83	75 - 108
Maryland School for the Deaf	8	5	3	87.88	104.38	103.50	78 - 110
Minneapolis Public School System	13	11	2	83.69	110.38	96.08	83 - 110
New Mexico School for the Deaf	7(1)	2	5(1)	84.82	113.50	101.12	90 - 110
Rochester School for the Deaf	8	3	5	89.25	108.50	102.00	85 - 110
St. Paul Public School System	6	3	3	84.50	114.50	93.67	75 - 110
Totals	60(1)	37	23(1)	84.62	110.09	98.36	75 - 110

( ) indicates the number of children who are absent during the 1974 testing period.

Table 2

Etiological Diagnoses by Program

School	Heredity	Illness	Meningitis	Prematurity	Rh Factor	Maternal Rubella	Trauma at Birth	Unknown	Program Total
American School for the Deaf	4	0	1	0	0	0	0	1	6
Callier Center for Comm. Disorders	1	0	0	0	0	5	0	6	12
Maryland School for the Deaf	4	0	1	0	0	1	1	1	8
Minneapolis Public School System	1	0	1	1	0	5	0	5	13
New Mexico School for the Deaf	1	1	1	1	0	0	0	3(1)	7(1)
Rochester School for the Deaf	2	2	1	0	0	0	0	3	8
St. Paul Public School System	0	0	2	1	1	0	0	2	6
Totals	13	3	7	3	1	11	1	21(1)	60(1)

( )indicates the number of children who were absent during the 1974 testing period.

Table 3

Age of Onset by Program

Program	Present at Birth	Birth to 12 Months	12 Months to 24 Months	Unknown	Program Total
American School for the Deaf	4	1	0	1	6
Callier Center for Comm. Disorders	10	0	0	2	12
Maryland School for the Deaf	7	1	0	0	8
Minneapolis Public School System	11	0	1	1	13
New Mexico School for the Deaf	3	0	2	2(1)	7(1)
Rochester School for the Deaf	2	2	0	4	8
St. Paul Public School System	3	0	2	1	6
Total	40	4	5	11(1)	60(1)

( ) indicates the number of children who were absent during the 1974 testing period.

Table 4

Administrative Organization of Services

	Residential Pupils		Day Pupils in Residential Schools or Hearing Centers		Pupils in Public School Classes for the Deaf		Pupil Integrated into Hearing Class		1/2 day Hearing and 1/2 day for Deaf	
	Children	hour/wk.	Children	hours/wk.	Children	hours/wk.	Children	hours/wk.	Children	hours/wk.
American School for the Deaf	5	30	1	30						
Callier Center for Communication Disorders			9	27 1/2			3	27 1/2		
Maryland School for the Deaf	8	27 1/2								
Minneapolis Public School System					5	33 3/4	1 1 *4	15 27 1/2 33 3/4	2	33 3/4
New Mexico School for the Deaf	1	22 1/2	4(1) 2	20 22 1/2						
Rochester School for the Deaf	4	27 1/2	4	27 1/2						
St. Paul Public School System					1 1	12 1/2 27 1/2	3	27 1/2	1	27 1/2
Totals	18		20(1)		7		12		3	

( ) indicates the number of children who were absent during the 1974 testing period.

*All 4 children are integrated into the same hearing class with a teacher of the deaf working in the classroom.

personnel and their qualifications which was provided by the supervising teacher and refers only to the personnel working with the present sample of children.

It should be stressed that the children in the present sample represent a subset of each program. Complete programs are not described in detail. Most of the programs, for example, have children through high school age. The Callier, Minneapolis and St. Paul programs serve large numbers of children at the preschool age with mild and moderate hearing impairments. These children, of course, are not included in the study and the extent to which findings might generalize to them is unknown.

Table 5

Program Staff by Length of Time with Program and Previous Work Experience

Program	Number of Staff Members Working With Sample	Length of Time with Program			Teachers with Previous Experience with Deaf or Hearing Children
		Under 2 years	2-5 years	Over 5 years	
American School for the Deaf	4	0	3	1	3
Callier Center for Communication Disorders	10	6	3	1	4
Maryland School for the Deaf	7	2	3	2	2
Minneapolis Public School System	14	2	6	6	7
New Mexico School for the Deaf	9	0	2	7	7
Rochester School for the Deaf	8	3	4	1	6
St. Paul Public School System	9	4	4	;	4

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Table 6

Breakdown of Programs by Teachers, Supportive Staff, and Certification

Program	Teachers		Supportive Staff					Tutors or Resource Teachers	Total	Certified to teach the deaf			Non Certified	
	Supervising	Regular	Social Workers	Psychologist	Occupational Therapists	Speech Therapist	Aides			BA/BS	MA	Ph. D.	Bachelor or Teaching Certificate Only	MA Only
American School for the Deaf	1	3	0	0	0	0	0	1	5	2	2	0	0	0
Callier Center for Comm. Disorders	1	5	0	0	0	0	4	0	10	3	3	0	0	0
Maryland School for the Deaf	1	4	0	0	0	1	3	0	9	2	1	1	1	0
Minneapolis Public School System	2	7	1	0	0	2	1	1	14	3	6	0	4	1
New Mexico School for the Deaf	2	6	0	0	0	1	0	0	9	1	8	0	0	0
Rochester School for the Deaf	1	5	0	0	0	0	1	0	7	2	2	0	2	0
St. Paul Public School System	2	3	0	0	1	1	2	0	9	2	3	0	2	0

Chapter 4

Results

Wechsler Intelligence Scale for Children (WISC)

At the outset of this project, the Leiter International Performance Scale was administered to all children in the sample. Because it reaches lower chronological age levels than other scales, and tests the ability to learn, rather than testing acquired skills already learned, it was deemed an appropriate criterion measure for inclusion.

In keeping with the guidelines of the original research proposal for this investigation an additional measure of intellectual functioning was administered to the entire sample population. In preparation for this administration, pilot testing was conducted with a sample of profoundly hearing impaired children in a Minneapolis suburb and a rural town in Southern Minnesota.

The Wechsler Intelligence Scale for Children (WISC), an outgrowth of the Wechsler-Bellevue Intelligence Scale, was administered in this investigation. Most of the items contained in the WISC are from Form II of the earlier scales, the main additions being new items at the easier end of each test to permit examination of younger subjects. This measure has been standardized for use with children of ages 5 through 15.

The WISC consists of twelve tests which are divided into two subgroups identified as verbal and performance. The following subtests of the Performance Scale were administered to all subjects participating in the evaluation:

1. Picture Completion: Specific identification of missing picture part.

2. Picture Arrangement: Accurate arrangement and sequencing of pictures.
3. Block Design: Reconstruction of graphic designs through the manipulation of blocks.
4. Object Assembly: Assemblage of components to construct a common object.
5. Coding: Copying of symbols into geometric figures.

Because of the unique characteristics of our subjects, it was necessary in most cases to supplement the standardized test directions with an appropriate form of manual communication.

Results

Table 7 summarizes by program the mean scaled scores for each of the WISC Performance Scale subtests as well as the mean Performance IQ scores. For the WISC, scaled scores are derivations of raw scores such that at each age and for each subtest the mean scaled score for the standardization sample is 10 with a standard derivation of 3.

The mean Performance IQ for the 61 children in this year's sample was 110.09. Scaled subtest scores range from 13.62 (Picture Completion) to 9.85 (Picture Arrangement) with intermediate scores at 10.03 (Copying), 11.93 (Block Design) and 12.02 (Object Assembly). Figure 1 illustrates the patterning of the subtest scores of the deaf sample as compared with hearing norms, and is perhaps indicative of a unique cognitive style in this deaf population.

Program scores from the current investigation range from 103.33 for the American School to 114.50 for the St. Paul System. As

Table 7

WISC Scores by Subtest and Program

School	N	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Copying	Total Performance IQ
American School for the Deaf	6	12.50	8.67	11.83	8.67	11.17	103.33
Callier Center for Communication Disorders	12	14.83	10.00	12.58	13.33	9.67	113.58
Maryland School for the Deaf	8	12.13	9.75	11.63	11.38	9.50	104.38
Minneapolis Public School Program	13	12.85	9.54	11.69	12.92	10.38	110.38
New Mexico School for the Deaf	8	13.75	10.75	12.75	12.38	10.13	113.50
Rochester School for the Deaf	8	14.38	10.13	11.06	12.25	8.25	108.50
St. Paul Public School Program	6	14.83	11.17	11.83	10.83	11.83	114.50
Total Mean Scores	60	13.62	9.85	11.93	12.02	10.03	110.09

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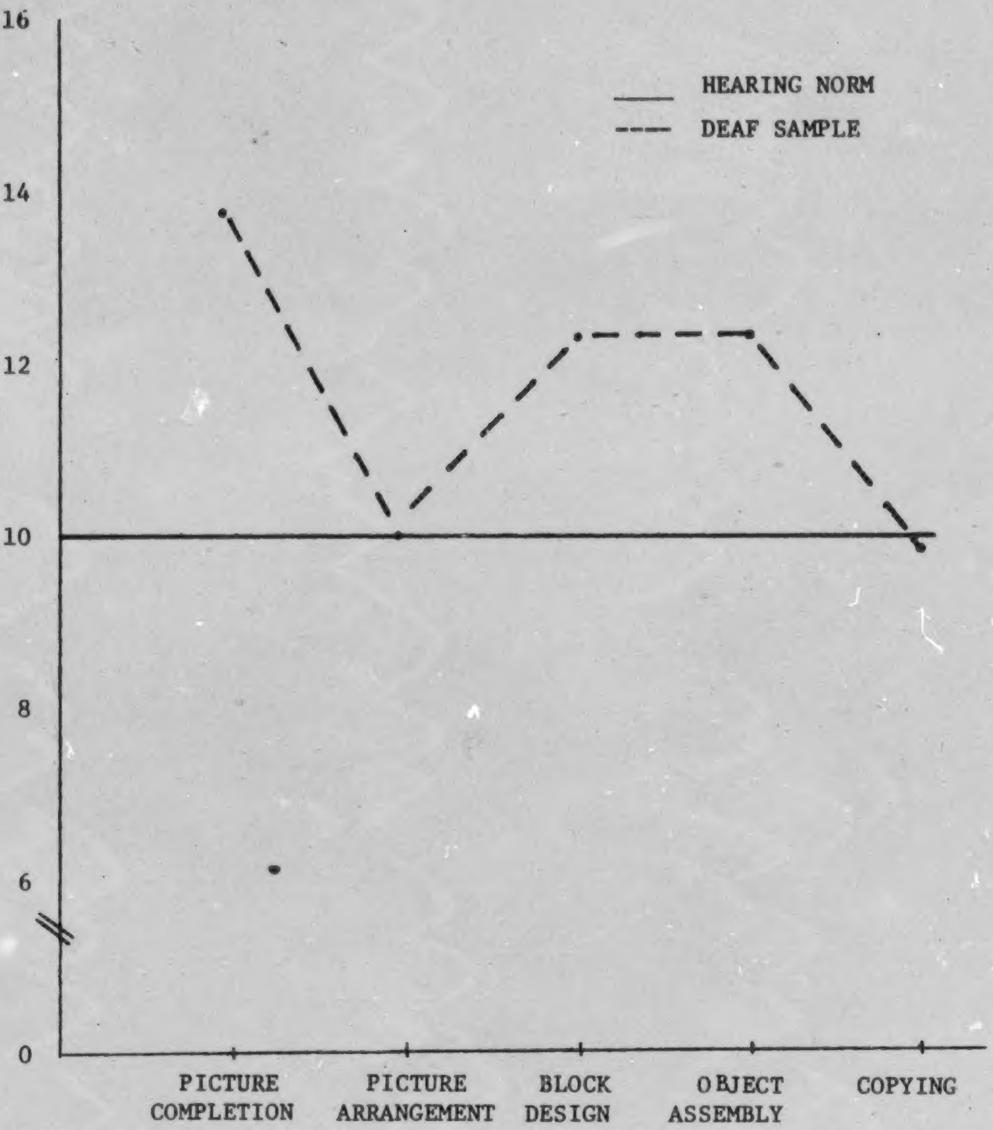

FIGURE 1 : Mean WISC Scaled Scores by Subtest

previously noted, t-test comparisons reveal no significant differences in total IQ scores by program.

For the 61 children tested, comparisons of this year's WISC Performance IQ scores and the Leiter Performance IQ scores obtained four years ago reveal a decrease of approximately 6 1/2 points from 116.51 to 110.06. This decrease in IQ scores across time is consistent with the findings of Quigley (1969) who reported a difference of 12 points between the Leiter Scale mean score and average scores from the WISC Performance Scale, administered four years later.

Despite these findings, a highly significant Pearson product-moment correlation of .86 between the two test scores was obtained for the current inquiry.

Illinois Test of Psycholinguistic Abilities

The Illinois Test of Psycholinguistic Abilities (ITPA) was employed in this study. The model of the ITPA (Kirk, 1969; Paraskevoulos and Kirk, 1969) is three dimensional and contains (1) the channels of communication, including auditory and visual input and verbal (vocal) and motor response; (2) psycholinguistic processes, including reception, association and expression; and (3) levels of organization, including the automatic and representational levels. For the purposes of this study, only the following five visual-motor subtests of the ITPA were administered to the sample population:

1) Visual Reception - measures the child's ability to gain meaning from visual symbols.
2) Visual Association - measures the child's ability to relate visually presented concepts.
3) Manual Expression - measures the child's ability to convey ideas manually.
4) Visual Closure - measures the child's ability to identify a familiar object from an incomplete pictoral presentation.
5) Visual Sequential Memory - measures the child's ability to replicate from memory, sequences of nonmeaningful geometric figures.

It should be noted that the Manual Expression subtest is not related to any arbitrary system of manual communication utilized by deaf individuals. Rather, it involves a child demonstrating appropriate actions, such as dialing a telephone or playing a guitar, when presented with visual stimulation.

Although all five subtests rely on the visual-motor channel, as previously noted, instructions are designed to be orally presented. Thus, additional instructional materials were devised to further assist the child in understanding the tasks when necessary. Instructions for all subtests were given in the mode of communication consistent with the methodology employed by each school.

In the standardization process, approximately 15% of the ITPA sample included children who were found to be nontestable. Similarly, each subject in the present study was eligible to receive a score regardless of refusal to participate or failure to obtain a basal on a particular subtest.

Results

The basic data consisted of scaled scores for 60 children on five ITPA subtests. Scaled scores are transformed raw scores such that at each age and for each subtest the mean or average performance of the standardization sample is 36, with a standard deviation of six. Scaled scores account for both group means and variances and provide a comparison of the child's performance.

For the present sample the total score for all 5 subtests averaged 180.65. As in 1972 and 1973, this score is almost identical to the norm of 180 established for hearing children, again suggesting that the children in this study are functioning normally in the visual-motor channel. ITPA scores for each program are summarized in Table 8. Average scores for the Callier Center, New Mexico School and St. Paul Program are above the mean for hearing children while the scores for the Minneapolis Program fall within a point of the hearing mean. Average scores for the Maryland and Rochester Schools fell below the mean.

Multiple t tests were used to compare the total ITPA scores by program, etiology, hearing loss and methodology. No significant differences were found at the .01 level.

Longitudinal Comparisons

In 1971, inspection of the scores of the deaf subjects across the five visual-motor subtests revealed a differential pattern of functioning for the deaf subjects as compared to their hearing counterparts. This pattern remained consistent for the 1972 data although scores on the Visual Reception, Visual Sequential Memory, Visual Association, and Visual Closure subtests regressed toward the hearing mean of 36. Further regression has been noted in the 1973 test results. Figure 2 presents comparisons of ITPA scores by subtest for 1971, 1972, 1973 and 1974.

From 1973 to 1974 the overall mean scores for subtests have varied less than one full point. With the exception of the Manual Expression subtest, the same scores have stablized within two mean points of the hearing norm as follows: Visual Reception (35.16); Visual Sequential Memory (37.76); Visual Association (34.48);

Table 8

Illinois Test of Psycholinguistic Abilities Mean Program Scores by Subtests

Program	Number of Subjects	Visual Reception	Visual Sequential Memory	Visual Assoctioan	Visual Closure	Manual Expression	Mean ITPA Score
American School for the Deaf	6	36.67	33.33	32.83	36.17	39.83	178.83
Callier Center for Comm. Disorders	12	36.33	39.58	36.33	37.25	40.42	189.92
Maryland School for the Deaf	8	33.13	33.63	32.38	31.00	38.38	168.50
Minneapolis Public School System	13	35.77	37.61	35.46	31.15	39.54	179.15
New Mexico School for the Deaf	7	36.00	38.00	35.43	36.57	40.57	183.71
Rochester School for the Deaf	8	32.38	32.50	31.75	33.13	43.38	173.12
St. Paul Public School System	6	35.50	41.16	35.67	36.83	42.33	189.83
Totals	60	35.16[1]	36.76[1]	34.48[1]	34.31[1]	40.50[1]	180.65[1]

[1] weighted mean scores

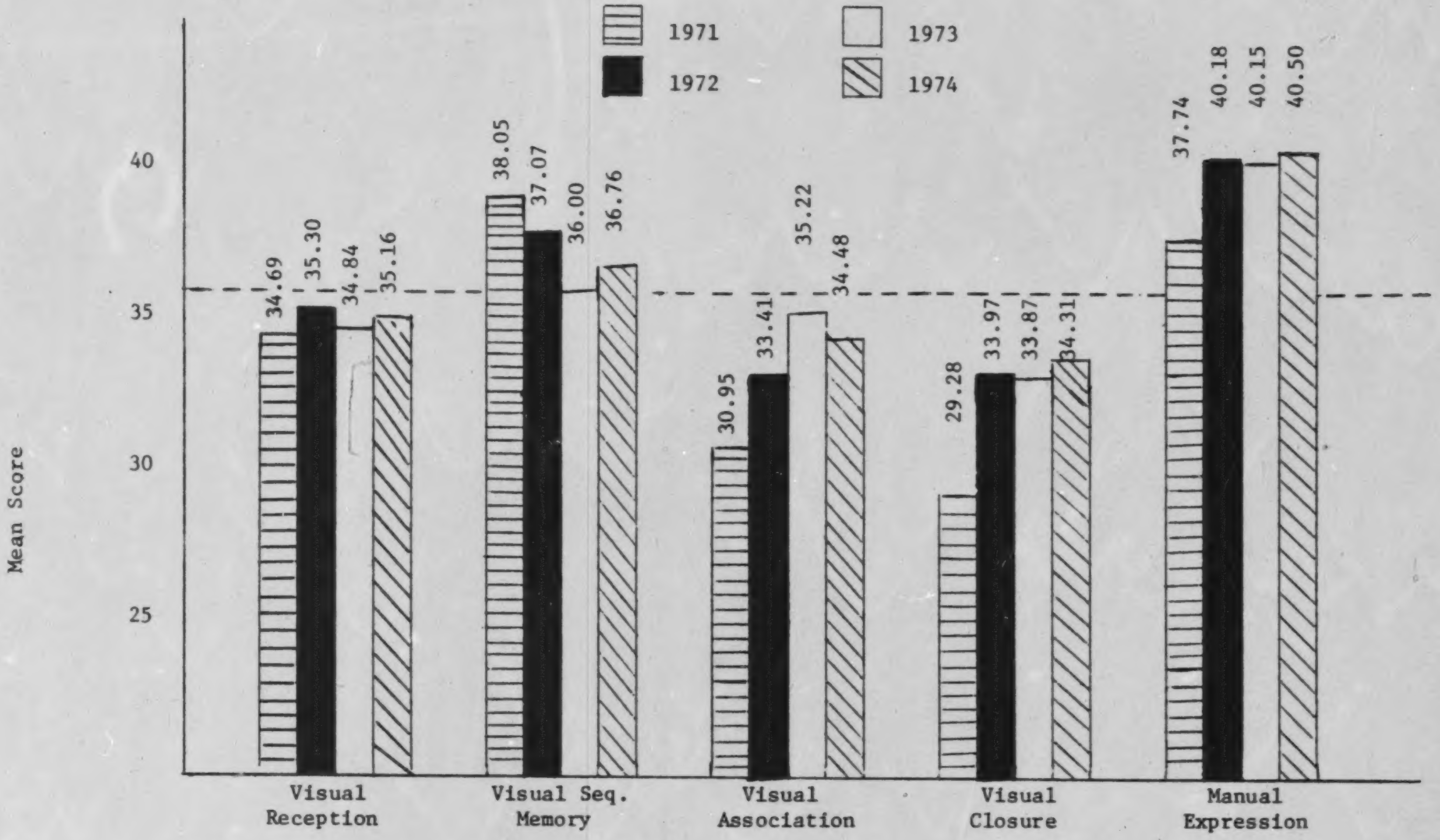

Figure 2. ITPA Subtest Scores Obtained in 1971, 1972, 1973 and 1974

Visual Closure (34.41); Manual Expression (40.50). As noted, deaf subjects have continued to maintain relatively higher scores on the Manual Expression subtests. The sample score for this subtest differs significantly from the hearing mean ($\underline{t}$ = 6.5189; $p < .001$).

These data lend further support to the results of the previous two years, i.e., that subjects in the present sample function normally in the visual-motor channel.

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Metropolitan Achievement Tests (MAT)

In the Spring of 1973 the Metropolitan Readiness Tests (MRT, Form B) were administered to 69 subjects participating in this evaluation. These tests were designed to measure the extent to which children have acquired those abilities which contribute to success in first grade, as well as to provide teachers with a quick and reliable instrument for assessing individual needs of children entering first grade. On the basis of pilot testing, the Matching, Alphabet, Numbers and Copying subtests were included in the 1973 test battery. (The reader is referred to EPHIC Research Report #57, Moores, Weiss & Goodwin for a complete description of findings.)

In contrast with the program emphasis during the earlier stages of the study, our children are now engaged in more scholastic and academically centered curricula. In an effort to administer items which more adequately measure the educational development of the subjects, the Metropolitan Achievement Tests (Primer Battery) Reading and Arithmetic subtests; were selected for inclusion in this year's test battery. Its development was based on extensive analysis of current educational materials, syllabi, state guidelines and other curricular sources. Appropriateness of content and format, clarity of wording, and other such factors were examined, and when necessary, adaptations for use with sign language were made. Instructions were provided in the mode of communication consistent with the methodologies employed at the various programs. In the spring of 1974 the following subunits of the MAT (Primer Battery) were administered:

Reading - attempts to measure pupils' beginning reading skills through letter identification, picture word and picture sentence association.

Numbers - attempts to measure pupils' understanding of basic computational principles and relationships including counting, measurements, number recognition, addition and subtraction of one digit numbers.

Results

The two subtests of the MAT were administered to the 60 subjects in the present sample. Since the authors of the MAT do not provide age adjusted scaled scores, statistical analyses were computed on the sample's raw scores by subtest. Mean raw scores for the Reading and Arithmetic subtests and total MAT scores by program are summarized in Table 9. The t-test comparisons reveal no significant differences by program for either subtest or total scores.

The MAT authors provide percentile rank scores for standardization samples at the end of kindergarten and the middle of first grade. These percentile ranks provide a comparison of the child's position relative to the normative group with the 50th percentile indicating a typical performance. Since the mean chronological age of the current sample is approximately 7 years, the percentile rank for the middle of first grade appears to be the most appropriate for use here. The present sample of 60 children received a mean percentile rank of 62 on the Reading subtest, a rank slightly above the average performance

Table 9

Metropolitan Achievement Tests (Primer Battery)

Mean Raw Scores by Program and Subtest

School	N	Reading		Arithmetic		Combined	
		$\overline{X}$	sd	$\overline{X}$	sd	$\overline{X}$	sd
American School for the Deaf	6	26.00	3.35	20.17	5.85	46.17	7.63
Callier Center for Communication Disorders	12	23.92	6.80	17.50	6.79	41.42	12.37
Maryland School for the Deaf	8	27.13	6.81	23.25	9.98	50.38	15.77
Minneapolis Public School Program	13	22.69	7.65	17.15	6.94	39.85	13.02
New Mexico School for the Deaf	7	27.86	4.26	21.14	6.57	49.00	9.68
Rochester School for the Deaf	8	29.50	3.07	22.38	5.80	51.87	7.33
St. Paul Public School Program	6	27.50	6.06	21.67	7.71	49.17	12.94
Total	60	25.85	6.23	19.95	7.23	45.50	12.23

of hearing first graders, while their mean percentile rank of 35 on the Arithmetic subtest falls below the typical score of the hearing group.

These findings are similar to those of the 1973 Metropolitan Readiness Tests in which the sample of deaf children scored significantly higher on the reading related tests of Matching and Alphabet while their performance on the Numbers test was significantly lower than that of the standardization sample. At that time it was felt that the relatively poor performance on the Numbers test could be attributed to the fact that all questions were presented verbally. Even in schools where signs and fingerspelling were added to the verbal presentation, there was still a possibility that the results were confounded by the receptive communication abilities of the children.

Although the verbal nature of the Arithmetic subtest may still account in part for the relatively poor performance of the deaf subjects on computational tasks, this second year of data lends further support to indications that perhaps these children are functioning below their hearing counterparts in the area of arithmetic, or that at this point the programs appear to be emphasizing the development of reading rather than computational skills.

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Communication Battery

In response to the need for empirical tests of the communication skills of young deaf children, three tests were developed. These measures were designed to assess receptive, expressive and articulative abilities.

At the time the communication battery was developed, vocabulary for all three tests was selected from lists of words provided by teachers, which the children were judged capable of speaking, speechreading, or recognizing in print. Each child in the sample, therefore, was evaluated by his or her teacher. Only the 50 words which occurred most frequently across all schools were selected for inclusion in the communication battery vocabulary. Prior to the testing date at each program, the list of 50 words was sent to the school so that the teachers could review or practice any unfamiliar words with the children. This procedure was developed to lessen the chances of any test being one of vocabulary alone rather than one of other communication abilities. In 1972, following field testing, the receptive communication and articulation tests were judged to be in a stage suitable for use in testing situations. For 1973 the receptive communication measure was modified and expanded to encompass additional items for administration in 1974. Validation of the instrument is continuing.

The expressive communication test was not judged to be at a point of development justifying its use as an assessment tool in 1972, and was therefore administered experimentally in 1972 and used in revised form in 1973. The expressive instrument was again administered in 1974 following extensive redesigning and modification.

Receptive Communication Scale

As the children participating in the study have become older it has become necessary to expand this measure to more adequately assess their increasing skills and abilities. Thus, each year the Receptive Communication Scale has been further developed to include additional and more complex grammatical constructions.

The receptive communication scale was developed to assess five different but not mutually exclusive modes of communication: 1) Sound Alone, 2) Sound plus Speechreading, 3) Sound and Speechreading plus Fingerspelling, 4) Sound and Speechreading plus Signs, and 5) the Printed Word. Number 1 is similar to the Auditory Method; number 2 to the Oral Method; number 3 to the Rochester Method and number 4 to Total Communication. The authors did not investigate reception of Speechreading, Fingerspelling or Signs alone. The object was to test the children under close to normal pedagogical conditions used with the deaf. Those conditions always included the spoken word.

In 1972, 20 items representing four levels of difficulty were developed using the basic vocabulary lists provided by teachers in the programs. At each level 4 items tested the following concepts: numbers, adjective-noun phrases, noun-conjunction-noun phrases and noun-verb-prepositional phrases. For each of the 20 correct items three additional multiple choice foils were constructed. Alternate choices were balanced in matrix form (e.g., picture of a red ball [stimulus item] along with a blue ball, a red top and a blue top [alternate foils]) so that children would have to receive an entire phrase rather than any part of it in order to make a correct response. The position of the correct choice was randomly determined on each page for each of the 20 items. A sample page is found in Appendix B.

The 20 stimuli were randomly assigned to one of five groups, each of which contained one item from every level of difficulty, enabling administration of any one of the five groups in any of the five modes of communication. A sample card was constructed to assist and/or train the child before each new mode of communication was introduced. To emphasize the change in mode, the same training card was always used.

The Receptive Scale was expanded in 1973 to include 5 items of noun-verb construction increasing the total number of items to 25. Each of these items was randomly inserted into one of the five groups of items described above. Test administration was consistent with that of 1972.

Receptive Communication Supplement

In 1974, item additions of 5 negative and 5 reversible passive voice forms adapted from Schmitt (1969) were randomized into the existing measure. These items were constructed in such a way that for each passive item the subject and object were reversed in one of the alternate foils (e.g., the boy was hit by the girl [stimulus item], and the boy hit the girl [alternate foil]). For each negative, one of the alternate foils was the positive construction of the same sentence (e.g., the boy is not walking [stimulus item], and the boy is walking [alternate foil]). These additions increased the number of items for each mode of communication from 5 to 7, rendering a total of 35.

In assessing comprehension of verb tenses, 15 items were developed incorporating vocabulary and tense from Thorndike's Teacher's Word Book. Each of the five series of three pictures was sequenced to include the future, present progressive and past tenses respectively, (e.g., the girl will sit, the girl is sitting, the girl sat) with the test item in each sequence being administered in one of the prescribed modes of communication. As with the receptive communication scale, a demonstration item was employed to assist the child in communication modes.

For the 1971-72 and 1972-73 evaluations, the Callier and Minneapolis programs requested that neither sign language nor fingerspelling be used in testing their oral students. With the exception of the children enrolled in total communication classes in the Callier program as of 1973, these modes were employed with neither group. The request by the Rochester School not to employ signs was also honored. Children in oral classes in the Minneapolis program and Callier Center were given three Sound plus Speechreading tests and children in the Rochester program received two Sound plus Fingerspelling administrations in place of signs which were ordinarily used in these portions of the measure.

At the time of the 1974 evaluation, the Callier program had officially changed from an oral approach to the use of total communication, and several children in the Minneapolis program had been reassigned to total communication classes within their school system. The remaining programs continued to use the methodologies previously employed.

Results

For purposes of analysis the Receptive Communication Scale has been separated into the following four sections:

1. Core Items (employed in the 1973 evaluation): 25 items consisting of 5 number; 5 adjective-noun; 5 noun-verb; 5 noun-conjunction-noun; and 5 noun-verb-prepositional phrase constructions.
2. Negatives: 5 supplemental negative constructions added to the revised 1974 communication scale.
3. Passives: 5 reversible passive items added to the revised 1974 communication scale.
4. Verb Tenses: 15 verb items comprised of the future, present and past tenses added to the revised 1974 communication scale.

Core Items

The basic data consisted of the per cent correct for each mode as well as the total per cent correct on all 25 items for each subject. Table 10 presents the average scores by mode and program.

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Table 10

Per Cent Correct on Receptive Communication Scale (Core Items) by Program and Mode of Communication

Program	N	Printed Word	Sound Alone	Sound & Speech-reading	Sound & SR & Finger-spelling	Sound & SR & Signs	Total % Correct
American School for the Deaf	6	90	40	53	77	83	68
Callier Center for Communication Disorders	12	67	40	65	51	80	63
Maryland School for the Deaf	8	77	37	65	75	93	69
Minneapolis Public School Program	13	65	58	67	55	85	64
New Mexico School for the Deaf	7	80	34	51	80	94	68
Rochester School for the Deaf	8	90	35	83	89	-	75
St. Paul Public School Program	6	77	53	90	97	93	82
Totals N		60	60	60	48	40	60
$\bar{X}$		76	44	68	75	88	69
Sd		29	27	31	28	21	19

Arcsin transformations (Winer, 1962) were applied to the data before the statistical analysis to minimize difficulties inherent in the use of proportional data.

Examination of Table 11 suggests that, in accordance with the findings of the 1971-72 and 1972-73 reports, the 1974 scores improve as dimensions are added. Because they do not involve direct person to person communication, Printed Word scores are considered separately. The remaining four modes of communication scores improve from sound alone (44%), to sound plus speechreading (68%), to sound and speechreading plus fingerspelling (75%), to sound and speechreading plus signs (88%). The overall accuracy is 69%. Despite continued improvement in the children's receptive communication skills, the hierarchy of difficulty for these four modes of communication has remained constant across the three year period from 1972 to 1974.

The five modes of communication were examined to determine if statistically significant differences among modes existed. Analysis by t test indicates that sign language is significantly easier (larger per cent correct) than Sound Alone or Speechreading and Fingerspelling, while Fingerspelling, Speechreading and the Printed Word are significantly easier than Sound Alone (Table 12).

The analysis of the data by programs using t-test comparisons revealed no significant differences for total program scores at the .01 level of probability. Analysis of the scores by the extent of hearing loss revealed a Pearson product-moment correlation of .30 between hearing loss and receptive communication scores.

Table 11

Receptive Communication Scale (Core Items): Percentage Scores Obtained in 1972, 1973, and 1974

Subtest	1971-72	1972-73	1973-74
Printed Word	38	56	76
Sound Alone	34	43	44
Sound and Speechreading	56	63	68
Sound and Speechreading and Fingerspelling	61	72	75
Sound and Speechreading and Signs	72	86	88
Total Percent Correct	50	62	69

Table 12

Receptive Communication Scale (Core Items): Significant Comparisons between Modes of Communication

Comparison			*t*	df
Sign Language	>	Fingerspelling	2.699*	86
Sign Language	>	Speechreading	3.879**	98
Sign Language	>	Sound Alone	9.047**	98
Fingerspelling	>	Sound Alone	5.618**	106
Speechreading	>	Sound Alone	4.136**	118
Printed Word	>	Sound Alone	6.073**	118

* $p < .01$

** $p < .001$

Negatives

In the examination of the negative items of the receptive scale, both the percentages of correct responses and positive interpretations of the negative phrase (e.g., picture selection of "the boy is walking, rather than "the boy is not walking") were considered.

The overall percentage of correct responses was 36% with subjects chosing the incorrect, positive interpretation of the negative 46% of the time (Table 13). Thus, the deaf subjects tended to ignore the negative cues and select the picture representing the opposite meaning more frequently than the correct response.

Inspection of the negative scores by mode of communication reveals that the deaf children received a higher percentage of correct responses when items were presented via the Printed Word (45%) than when presented by other modes of communication. Sign Language (38%) and Speechreading (34%) were the next most efficient modes, while Sound Alone (32%) and Fingerspelling (30%) were the least effective means of conveying negative phrases. Initial t-test comparisons yielded no significant differences for negative scores by program.

Passives

Evaluation of the five passive additions to the receptive scale includes both percentages of correct responses and the incorrect reversals of passive phrases (e.g., picture selection of "the girl hit the boy," rather than "the girl was hit by the boy"). There was a total of 300 passive items for the 60 children.

The overall percentage of correct responses was 29% with sub-

Table 13

Receptive Communication Scores (Negatives)
By Program

School	N	Percent Correct	Percentage of Positive Interpretations of Negatives Chosen	Range of Individual Subject Scores (Percentage Score)
American School for the Deaf	6	33	47	20 - 60
Callier Center for Communication Disorders	12	30	53	0 - 60
Maryland School for the Deaf	8	30	40	0 - 60
Minneapolis Public School Program	13	45	42	0 - 100
New Mexico School for the Deaf	7	40	51	20 - 60
Rochester School for the Deaf	8	38	43	20 - 60
St. Paul Public School Program	6	33	47	0 - 100
Total	60	36	46	0 - 100

jects choosing the reverse interpretation of the passive phrases 47% of the time (Table 14). It therefore appears that deaf subjects frequently employ the active interpretation of passive phrases, and ignore the passive marker "by."

In separate investigations of deaf children's acquisition of the passive voice, both Power (1971) and Schmitt (1969) observed deaf children between the ages of 8 and 18 making similar types of errors in the comprehension of passives. They suggest that this incorrect interpretation occurs because of the student's failure to reverse the subject-object order of passive sentences. Thus the deaf child not only fails to interpret passive sentences but frequently derives information which is the opposite of that which is intended.

Examination of the passive scores by mode of communication indicates that deaf children received a considerably higher percentage of correct responses when items were presented using the printed word (50% correct). Scores for the remaining modes of communication cluster around chance level of 25%, with Sign Language at 28%, Fingerspelling at 25%, Speechreading at 24%, and Sound Alone at 22%. Initial _t_-test comparisons revealed no significant differences for passive scores by program.

Verbs

In the analysis of the 15 verb tense items the percentage of correct responses by program, mode of communication, and verb tense were considered.

The total percent correct of all 60 children across the 15

Table 14

Receptive Communication Scores (Passives)
By Program

School	N	Percent Correct	Percentage of Reversed Passives Chosen	Range of Individual Subject Scores (Percentage Score)
American School for the Deaf	6	40	47	70 - 60
Callier Center for Communication Disorders	12	25	45	0 - 60
Maryland School for the Deaf	8	28	53	0 - 60
Minneapolis Public School Program	13	31	49	0 - 80
New Mexico School for the Deaf	7	37	40	0 - 60
Rochester School for the Deaf	8	23	58	0 - 60
St. Paul Public School Program	6	37	37	20 - 60
Total	60	29	47	0 - 80

items was 39%. It appears that the Printed Word, 42% correct, was the most effective means of presenting the verb tense items to this group of children. Scores of the remaining four modes of communication are relatively close with Sound Alone and Fingerspelling at 38% correct, Speechreading at 37% correct and Sign Language at 34% correct (Table 15).

By verb tense, the children recognized the present progressive tense most frequently (59%), followed by the past tense (41%) and the future tense (17%). However, these findings are confounded by the fact that the subjects had a tendency to select most often the pictures in the medial position which depicted the present progressive tense. Disregarding the correct responses, subjects chose the pictures in the initial position 14%, the medial position 56%, and the final position 30% of the time. A t test comparison reveals no significant differences for verb tense items by program.

Expressive Communication Scale

In addition to the articulation portion of the battery, a communication scale was developed to assess expressive language abilities. In 1973, stimuli for the expressive scale consisted of twenty-five pictures selected from the alterantive foils of the receptive communication scale representing five levels of linguistic difficulty: number concepts, adjective-noun phrases, noun-conjunction-noun phrases, noun-verb, and noun-verb-prepositional phrase constructions.

It was felt that the simplicity of the stimulus items tended largely to elicit naming responses rather than allowing for a more

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Table 15

Percent Correct on Receptive Communication Scores (Verb Tense)
by Program and Mode of Communication

School	N	Printed Word	Sound Alone	Speech-reading	Finger-spelling	Sign Language	Total
American School for the Deaf	6	61	16	33	44	39	39
Callier Center for Communication Disorders	12	36	42	31	37	37	37
Maryland School for the Deaf	8	29	33	33	16	37	30
Minneapolis Public School Program	13	44	36	38	17	25	39
New Mexico School for the Deaf	7	62	33	43	43	33	43
Rochester School for the Deaf	8	37	46	42	52		46
St. Paul Public School Program	6	33	57	39	50	28	41
Total	60	42	38	37	38	34	39

connected narrative description. Therefore, in the 1974 evaluation eight sequenced picture stories, each consisting of four to five pictures selected from the Developmental Learning Material (DLM) Sequential Cards, were used as stimulus items. On the basis of pilot testing, it was found that these more complex stimuli provided a greater opportunity to use connected language in the expressive attempts.

In an effort to stimulate descriptive communication, a pretest training period was conducted during which questions were directed to the subjects concerning the content and meaning of the demonstration sequenced item. The eight sequenced picture stories were then presented in random order; each subject was encouraged to relay a story about the picture series. The children were free to say as much or as little about each picture as they chose, and to use a mode of communication of their preference.

Sessions were video taped for later review. Three groups of raters were employed to observe the video tapes. To account for differences in communication approaches and skills, these selected groups were comprised of eight Interpreters, eight Deaf Adults, and eight Graduate Students in Education who were unfamiliar with manual communication. All twenty-four raters were instructed to write what they thought each child was communicating; those raters who were naive in manual communication and those Deaf Adults viewing oral communication were encouraged to abstract as much information from the video tapes as possible. The tapes were later reviewed and transcribed via collaboration of an interpreter and teacher of the deaf, both

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proficient in the use of sign language and fingerspelling.

For purposes of the present report, analysis of the tapes will be limited to a discussion of intelligibility and preferred mode of communication. A more detailed analysis of the quality and type of grammatical constructions employed by the children will be published in a supplementary report. While substantial revisions in the 1974 test format have been made, the expressive communication scale is still considered to be in an experimental stage. Work is continuing to further develop this measure in content and format.

Results

The mean number of units of expression (any sign, gesture, or fingerspelled word used independently or in conjunction with the spoken word) for each individual taping session was 143.3 with a range of 38-415 units. The basic data consisted of the percentage of words correctly identified by all twenty-four raters for each child.

There are a total of 56 subjects in the current analysis. Due to mechanical failure, distortion of the audio and visual portion of the tape for four subjects at the Rochester School rendered the tape uninterpretable. These subjects were omitted from the analyses. It is not known how these deletions affected the score from the Rochester School. A summary of these intelligibility ratings by school and rater group is found in Table 16.

Raters correctly identified 32% of the expressive attempts for the 60 children. By groups, Interpreters achieved 46% correct, while the Deaf Adults and Graduate Students achieved 31% and 20% correct

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Table 16

Expressive Communication Scale: Intelligibility Scores by Program

School		Graduate Students Mean Percentage	Interpreters Mean Percentage	Deaf Adults Mean Percentage	Total % Intelligible	Range of Individual Scores
American School	6	14.27	43.54	42.23	33.36	29 - 41%
Callier Center	12	18.10	42.43	29.18	29.90	21 - 42%
Maryland School	8	14.23	59.89	61.23	45.11	27 - 57%
Minneapolis Program	13	29.30	46.56	15.99	30.61	10 - 48%
New Mexico School	7	11.68	48.86	42.98	34.50	8 - 51%
Rochester School	4	7.84	17.81	17.18	14.28	10 - 21%
St. Paul Program	6	30.62	48.10	14.73	31.15	15 - 55%
Total	56	19.54*	56.66*	31.41*	32.21*	8 - 57%

* Weighted mean

respectively. Percent correct for individual children ranged from 8 to 57. Comparisons by *t* test show the Maryland School for the Deaf to be significantly superior to the Rochester School and the Callier Center; scores from the American School for the Deaf and Callier Center were significantly higher than those of the Rochester School (Table 17).

The following criteria for identification of a subject's preferred mode of communication were developed:

1. *Total Communication* - 70% of all units of expression conveyed via simultaneous verbalization and signing or fingerspelling.
2. *Rochester Method* - 70% of all units of expression conveyed via simultaneous verbalization and fingerspelling.
3. *Sign* - 70% of all units of expression conveyed via signs. Signs were not consistently accompanied by spoken words.
4. *Fingerspelling* - 70% of all units of expression conveyed via fingerspelling. Fingerspelling was not consistently accompanied by spoken words.
5. *Gesture* - 70% of all units of expression conveyed via gestures.
6. *Manual* - 70% of all units of expression conveyed via gestures, signs or fingerspelling which were not necessarily accompanied by verbalization.
7. *Oral* - 70% of all units of expression conveyed via verbalization only.

Only one child did not meet any of the above criteria. His expressive attempts were illustrated through the use of either gestures or verbalization, neither of which were sufficient to reach the 70% criteria level.

The most frequently employed mode of communication was total communication (N = 18), followed by the oral method (N = 17) and signs

Table 17

Significant *t*-test Comparisons on

Expressive Communication Scale by Program

Comparisons		df	*t*
Maryland School for the Deaf	> Callier Center for Communication Disorders	19	3.58 *
	> Rochester School for the Deaf	11	5.15 **
American School for the Deaf	> Rochester School for the Deaf	9	5.21 **
Callier Center for Communication Disorders	> Rochester School for the Deaf	15	3.57 *

* $p > .01$

** $p > .001$

(N = 14). One child employed the Rochester Method while 5 used a manual approach to convey information (Table 18).

It is interesting to note that while each participating program implements a particular methodological approach to instruction, students seem to have developed personal communicative styles often reflective of, but not necessarily limited to the given philosophy of communication employed by particular programs.

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Table 18

Frequency of Preferred Mode of Communication

	N	Total Communication	Sign	Rochester Method	Finger-spelling	Manual	Oral	Other
American School for the Deaf	6	3	2	0	0	1	0	0
Callier Center for Communication Disorders	12	5	2	0	0	2	3	0
Maryland School for the Deaf	8	5	3	0	0	0	0	0
Minneapolis Public School Program	13	1	2	0	0	1	9	0
New Mexico School for the Deaf	7	3	4	0	0	0	0	0
Rochester School for the Deaf	4	0	0	1	0	1	1	1
St. Paul Public School Program	6	1	1	0	0	0	4	0
TOTAL	56	18	14	1	0	5	17	1

Articulation

The articulation portion of the Battery was comprised of ten one and two syllable words. They were as follows:

apple
bird
cat
dog
eye
top
fish
milk
red
shoe

Each word was presented individually by means of a colored, 5 by 7 inch illustration. Upon presentation the subject was instructed to repeat each word after the examiner until it was determined that his or her best attempt at that word had been recorded by a portable tape recorder. If the child did not offer the word spontaneously, the examiner again presented the word for a more accurate imitation. Every attempt was made to obtain an utterance for each of the ten words.

The complete list of words to be used was sent to the schools in advance of the test date to enable teachers to review or practice any unfamiliar words. The test, therefore, was one of the child's ability to articulate words he knew rather than a test of his ability to imitate unfamiliar speech produced by others.

For the previous two years (1972, 1973) a stereo system was employed which necessitated recording the subjects' and examiners' voices on separate channels. Because of the number of words lost in the subsequent editing process an alternate recording method was devised. To eliminate mechanical complexities and to facilitate the editing process, a Panasonic RQ 3095 monaural tape recorder was used in the collection of this year's articulation data. This modification in the recording procedure facilitated securing ten utterances per subject, the total number prescribed for each child.

To prepare the tapes for judging by raters, each child's best attempt at the ten words was edited and randomized for transfer to another recording unit. In this way responses for children from one program were randomly mixed with children from all other programs. The resulting tape was then played for two groups of 10 raters each, 15 of whom were unfamiliar with the speech of the deaf. The remaining 5 raters either worked with deaf adults or were teachers of young deaf children.

The first group of 10 raters heard the tape from beginning to end. To eliminate any order effects, the second group of 10 heard the end, middle and beginning of the tape respectively. The 20 raters were presented with a list of 25 words (Appendix C) and instructed to select from this list the words uttered by the subjects. If unable to determine a word, the raters were encouraged to guess. Subjects were introduced by first name and subject number. Their ten utterances were then presented, each followed by a five second pause during which the raters recorded their responses on the forms provided.

Results

Scores on this measure consist of the percentage of correct identifications by raters for each of the 60 children. The word most readily identified was "apple" (71%), followed by "eye" (48% and "bird" (48%). The words "cat" (17%) and "red" (25%) were identified with the greatest difficulty. The overall accuracy across all seven programs was 37%. The Minneapolis (65%) and St. Paul (60%) programs received the highest scores, while the remaining five programs scored considerably lower with scores ranging from 21% to 29% (Table 19).

To minimize problems inherent in proportional data, arcsin transformations were again applied to the data for all statistical analysis. Program comparisons employing the t test revealed that articulation scores from the Minneapolis and the St. Paul programs were significantly higher than those of the remaining 5 programs. For these comparisons, individual t statistics are summarized in Table 20.

As in 1973, this is the only section of the report in which differences at the .05 level have been accepted as significant. In the past .01 has been the acceptable level. Although mean scores between the top two programs (Minneapolis, 65%, St. Paul, 60%) and the bottom two programs (American School, 21% and New Mexico School, 23%) were great, not all differences reached the .01 level because of the large range of individual scores within programs.

It was hypothesized that there would be a strong relationship between articulation scores and hearing loss. A Pearson product-moment correlation of .60 ($p < .001$) between articulation scores and hearing loss confirms this hypothesis.

Table 19

Articulation Scores: Percentage of Correct Identifications by 20 Raters across Programs

Program	N	Apple	Bird	Cat	Dog	Eye	Fish	Milk	Red	Shoe	Top	Total	Range of individual Subject Scores
American School for the Deaf	6	69	33	3	19	29	29	2	3	24	16	21	8 - 37
Callier Center for Comm. Disorders	12	70	29	19	37	33	16	21	13	23	25	29	3 - 59
Maryland School for the Deaf	8	59	32	4	28	51	20	4	15	25	15	25	11 - 40
Minneapolis Public School System	13	97	74	31	69	68	70	68	52	68	51	65	18 - 96
New Mexico School for the Deaf	7	54	26	7	35	31	21	13	12	17	16	23	3 - 65
Rochester School for the Deaf	8	54	48	7	9	48	25	8	13	11	23	25	9 - 46
St. Paul Public School System	6	83	55	43	73	68	70	55	58	44	50	60	17 - 93
Totals	60	71	44	17	41	48	35	28	25	33	30	37	3 - 96

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Table 20

Articulation Measure
Significant *t*-test Comparisons
by Program

Comparison			*t*	df
Minneapolis Public School Programs	>	American School	3.6515**	17
	>	Callier Center	3.7941**	23
	>	Maryland School	3.8782**	19
	>	New Mexico School	3.4371**	18
	>	Rochester School	3.7366**	19
St. Paul Public School Program	>	American School	2.8679*	10
	>	Callier Center	2.7167*	16
	>	Maryland School	3.0539*	12
	>	New Mexico School	2.5013*	11
	>	Rochester School	2.8413*	12

* $p < .05$
** $p < .01$

This measure was administered in 1972 as well as in 1973 and 1974. However, the raters were different in the three years and the authors do not believe that a treatment of comparative scores across the three years would provide reliable information. Because of a lack of consistency among raters from year to year and the new recording system employed, no statistical, longitudinal comparisons have been made. It should be noted that the Minneapolis and St. Paul programs have continued to maintain relatively higher scores across the three-year period than the remaining 5 programs. This would seem to suggest the operation of some element within these two programs which continues to foster a performance superior to the other programs.

Cognitive Development Measures

Barbara J. Best

During the 1972-73 Preschool Evaluation several new measures were initiated. These measures were based on a Piagetian model of cognitive development and were readministered during the 1973-74 Evaluation. A brief description of the Cognitive Development Measures and the theory generating the measures follows.

During the period between the ages of five and seven, children's thinking matures in several ways. For example, as the child grows older, his thinking tends to become more reversible, less egocentric and more decentrated. Three Piagetian measures, appropriate for children within the range of five to seven, were chosen in order to measures these changes. The correct solution to each task depends upon the maturity of the child's thinking skills, but also draws on different types of experience, and thus a child's performance should be affected by deafness in different ways.

The first task used was a measure of classificatory development in which the children were required to sort certain materials into suggested classes. There were two parts to this task, one involving the sorting of beads, and one involving the sorting of pictures. A correct solution of the beads task required the children to sort the beads on the basis of shape. A correct solution of the picture task required that the children sort the picture cards into classes--animals, toys, people, household goods.

The second task was a measure of the development of conservation, in this case, conservation of number. The children were first trained to respond to equality or inequality between two groups of blocks. The blocks were then manipulated in several ways, including rotation, adding equal numbers of blocks to each group, expanding one group, dividing one group into three subgroups, and collapsing one group. Children who understood the concept of conservation made judgments of equality between the two groups despite the manipulations.

The third task used was a measure of seriation ability. Children were first given ten sticks, differing from each other in length by 1/2 inch, and were asked to pick out the smallest and the largest sticks from the group. The three smallest sticks were then used to construct an example series for the child who was asked to copy the example. After the child succeeded in constructing the example, he was asked to construct a series using five and then ten of the sticks, and to insert three new sticks into his completed ten-stick series.

These particular measures were chosen because they tap the important changes in cognitive development, as outlined by Piaget, which take place during the years from five to seven. It has also been argued that the child's cognitive development is a more stable measure of a child's intellectual functioning than is an IQ score. Thus, the purpose behind the creation of these measures was an attempt to differentiate the effectiveness of the various programs involved on some measure other than language and academic skills. It is also of interest to determine whether or not there is a relationship between cognitive development and the child's academic achievement.

The three measures of cognitive development were administered to 60 children in the preschool study. The results of each test can be seen in Table 21. The total mean score for all schools combined was 33.0 with a range of 32.2 to 33.8. This compares to a total mean score of 28.74 in the 1972-73 study. All schools except the Rochester school showed progress in their cognitive development during the 1973-74 school year. Again, _t_ tests were run to compare all schools on each measure. No significant differences were found between the schools on any of the measures of cognitive development, suggesting that children in all the schools are proceeding at a similar rate of cognitive development.

It is interesting to question what relationship exists between a child's level of cognitive development and other measures of his developmental progress. Pearson product-moment correlation coefficients between the cognitive development measures and other measures are presented in Table 22. It can be seen that the measures of cognitive development are positively correlated with all other developmental measures. The total cognitive score is significantly correlated with Receptive Communication, the Numbers subtest on the Metropolitan Achievement Test, and the Illinois Test of Psycholinguistic Abilities total score. The Seriation and Classification subtests show this same pattern while the Conservation subtest is not significantly correlated with any of the other measures. The reading subtest of the MAT is not significantly correlated with any of the cognitive measures, suggesting that learning to read may be based on cognitive factors other than those measured in the test of cognitive development used in this study.

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Table 21

Cognitive Development Scores by Program

	N	Classification		Conservation		Seriation		Total	
		$\overline{X}$	sd	$\overline{X}$	sd	$\overline{X}$	sd	$\overline{X}$	sd
American School for the Deaf	6	6.2	1.6	17.3	3.0	9.8	.8	33.5	3.7
Callier Center for Communication Disorders	12	6.4	1.4	16.5	2.6	9.8	1.8	32.8	4.0
Maryland School for the Deaf	8	6.2	1.7	18.2	2.4	8.8	2.1	33.2	5.0
Minneapolis Public School System	13	6.6	.76	16.7	3.6	9.6	1.8	32.8	4.8
Nex Mexico School for the Deaf	7	5.8	1.3	16.7	3.3	9.7	2.6	32.2	4.9
Rochester School for the Deaf	8	6.2	1.1	17.1	4.2	9.4	2.3	32.8	6.2
St. Paul Public School System	6	6.5	1.2	17.3	4.2	10.0	1.3	33.8	4.8
Total	60	6.3	1.3	17.2	3.2	9.6	1.8	33.0	4.6

Table 22

Pearson product-moment Correlation Coefficients:

Cognitive Development Measures with Other Selected Measures

	Classification Total	Conservation Total	Seriation Total	Cognitive Total
Total Receptive Communication	.340*	.266	.308	.397*
MAT: Reading	.200	.143	.233	.256
MAT: Numbers	.352*	.243	.340*	.399*
ITPA: Total	.503**	.120	.408**	.382*

* p < .01
** p < .001

The lack of differences between schools on cognitive measures is interesting for two reasons, one theoretical and one practical. Theoretically, these results suggest that differences in academic curriculum do not necessarily affect the cognitive development of children. And, practically, since there were no significant differences on other developmental and achievement measures, academic performance may be more readily attributable to differential programs at the various schools. In other words, while programmatic differences may not effect cognitive development per se, there is evidence that they do effect the child's performance in school.

Classroom Observation

During visitations, observations were made in the three classes containing the largest number of children in each of the seven programs. Following each observation, raters used a prescribed format to record the type of activity along with the employed mode of communication for the 45 minute observation period.

Equipment and educational materials in use, or contained within the classroom were noted on the observation form listing items commonly found in pre-primary and primary programs. A modified version of DiLorenzo's (1969) Classroom Observation Schedule with additions appropriate to a population of deaf children was used. While no content changes were made, the format employed in 1973 was further revised to expedite the recording and the analysis process for the present year (Appendix D).

Following each observation period, statements were rated on a seven point scale (never too frequently observed) under five major categories:

1) Classroom Organization encompassed program organization and implementation on an individual and group basis.

2) Discipline and Classroom Relationships addressed the manner in which any behavioral differences were handled or circumvented. The general classroom disposition was also noted.

3) Structuring Program focused on the relevant use of special materials and implementation of instructional goals and objectives.

4) Encouraging Language and Speech Development pertained to various method(s) employed to foster speech and language growth within the classroom, e.g., discussion periods, controlled practice, planned exposure to concepts.

5) Reaction to Pupil Needs concerned the teacher's recognition and assessment of individual impairments and needs, as well as his ability to effectively adapt the curriculum to the developmental status of each student.

In a supplemental segment of the form entitled Communication Analysis, the various modes of communication employed in the classroom by the teacher and child (child to child, child to teacher, teacher to child) were rated on the same seven point scale.

Results

Consistent with findings of the past three years, the amount of equipment and materials available to teachers in all classrooms was extensive. An increase in the presence of academic materials was attributed to the fact that most children are enrolled in early primary level classes. One of a variety of auditory units was housed in each classroom observed, some of which could be used by the subjects outside of the classroom setting. Only 8 teachers of the 35 observed this year were included in last year's observations.

The raw data were converted to the average rating of the two observers for each item. Program scores consisted of the mean of these combined scores for items in each of the five categories. Initial t-test computations revealed significant differences in all the categories.

In the category of Classroom Organization, scores for the New Mexico, Maryland, Rochester and American Schools, and the Callier Center were all significantly higher than the Minneapolis Program. The score for the New Mexico School was also significantly higher than that of the St. Paul Program (Table 23).

The New Mexico, Maryland and Rochester Schools were rated significantly higher than the Minneapolis Program in the area of Discipline and Classroom Relations (Table 23).

Program comparisons in the category of Structuring Program revealed that scores from the New Mexico, Maryland, Rochester and American Schools, the St. Paul Program and the Callier Center were all significantly higher than that of the Minneapolis Program. The New Mexico School also scored significantly higher than the American School and the Callier Center in this category (Table 23).

Scores significantly higher than the Minneapolis Program were obtained by the New Mexico, Maryland, Rochester, American and Callier Programs for the classification Encouraging Language and Speech Development (Table 23).

Investigation into the area of Reacting to Pupil Needs revealed significantly higher ratings for the New Mexico, Rochester and Maryland Schools than those of the Minneapolis Program (Table 23).

For each program, t-test comparisons were computed on the total observation scores. Significant comparisons are summarized in Table 24.

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Classroom Observation Schedule

Significant t-test Comparisons by Program and Category

Classroom Observation Schedule Category	Comparison	t	df
Classroom Organization:	New Mexico School > St. Paul Program	3.19*	52
	> Minneapolis Program	4.61**	52
	Maryland School > Minneapolis Program	3.73**	52
	Rochester School > Minneapolis Program	3.91**	52
	Callier Center > Minneapolis Program	3.11*	52
	American School > Minneapolis Program	2.78*	52
Discipline and Classroom Relations:	New Mexico School > Minneapolis Program	4.47**	52
	Maryland School > Minneapolis Program	4.12**	52
	Rochester School > Minneapolis Program	3.15*	52
Structuring Program:	New Mexico School > American School	2.82*	46
	> Callier Center	2.80*	46
	> Minneapolis Program	5.50**	46
	Maryland School > Minneapolis Program	4.97**	46
	Rochester School > Minneapolis Program	4.34*	46
	St. Paul Program > Minneapolis Program	3.67*	46
	Callier Center > Minneapolis Program	3.40*	46
	American School > Minneapolis Program	3.27*	46

* $p < .01$

** $p < .001$

Table 23 (continued)

Classroom Observation Schedule

Significant *t*-test Comparisons by Program and Category

Classroom Observation Schedule Category	Comparison	*t*	df
Encourage Language and Speech Development:	New Mexico School > Minneapolis Program	4.99**	22
	Maryland School > Minneapolis Program	4.88**	22
	Rochester School > Minneapolis Program	3.83**	22
	American School > Minneapolis Program	3.41*	22
	Callier Center > Minneapolis Program	3.17*	22
Reacting to Pupil Needs:	New Mexico School > Minneapolis Program	3.83*	40
	Rochester School > Minneapolis Program	3.28*	40
	Maryland School > Minneapolis Program	2.91*	40

* $p < .01$

** $p < .001$

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Table 24

Significant Comparisons of the Total Classroom Observation Schedule Score by Program

Comparison		t	df
New Mexico School	> American School	4.38**	220
	> Callier Center	4.72**	220
	> Minneapolis Program	10.27**	220
	> St. Paul Program	5.20**	220
Maryland School	> Callier Center	3.11*	220
	> American School	2.87*	220
	> Minneapolis Program	8.81**	220
	> St. Paul Program	3.69**	220
Rochester School	> Minneapolis Program	8.23**	220
	> St. Paul Program	2.88*	220
American School	> Minneapolis Program	6.14**	220
Callier Center	> Minneapolis Program	6.33**	220
St. Paul Program	> Minneapolis Program	5.34**	220

* $p < .01$

** $p < .001$

Communication Analysis

Child to Child

The degree and mode in which children communicated with each other and with their teachers were rated on a seven point scale from "never" to "frequently." Scores were computed in the same manner as in the previously discussed portion of the questionnaire. Because this measure deals directly with the type of communication employed in the classroom, the total communication classes in Minneapolis have been treated apart from the oral classes. Inspection of Table 25 reveals that there is a range in the amount of observed interaction between children within programs from 14.00 (Minneapolis-Oral) to 21.26 (New Mexico School). Sign language is the most frequently used means of communication for the sample as a whole. Written communication between children was not observed in any program.

At the American, Maryland, New Mexico Schools, the St. Paul, and Minneapolis total communication programs and the Callier Center, signs were the most common mode of communication between children. The second highest score for the American, New Mexico, Minneapolis total communication classes and St. Paul programs was found in the Combined category (the simultaneous use of Signs, Fingerspelling and Oral-Aural communication) while the category in secondary position in the Maryland School was Oral-Aural. Gestures and Oral-Aural communication were the second most frequently employed mode of communication at the Callier Center. Oral-Aural communication followed by gestures was observed most frequently in the Minneapolis

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Table 25

Classroom Observation Ratings of Communication Modes by Program
(Child to Child)

Program	Fingerspelling	Sign	Oral-Aural	Combined	Written	Gestures	TOTAL
American School for the Deaf	2.17	6.00	1.83	4.50	1.00	2.50	18.00
Callier Center for Communication Disorders	2.33	4.17	3.33	3.17	1.00	3.33	17.33
Maryland School for the Deaf	2.67	5.50	3.83	3.67	1.00	2.50	19.17
Minneapolis Public School System (Oral)	1.00	1.25	5.25	1.00	1.00	4.50	14.00
(TC)	1.50	5.00	2.50	3.50	1.00	4.50	18.00
New Mexico School for the Deaf	3.83	5.83	4.00	4.33	1.00	2.17	21.16
Rochester School for the Deaf	4.63	3.17	3.33	3.50	1.00	3.17	18.80
St. Paul Public School System	1.83	4.67	3.83	3.50	1.00	2.33	17.16
TOTAL	19.96	35.59	27.90	27.17	8.00	25.00	

oral classes. The children from the Rochester School used fingerspelling most frequently, with their second highest score falling in the Combined category (simultaneous use of Fingerspelling and Oral-Aural communication).

Child to Teacher

Examination of Table 26 summarizes the pattern of communication from child to teacher. Child-teacher communication was observed most frequently in the New Mexico School (23.38) and least frequently in the Minneapolis oral classes (13.00). Overall, the most common means of child-teacher communication is Sign Language followed by Oral-Aural communication. The written form was observed only in the American, Maryland and New Mexico Schools. The most common categories by program were: the American School, Signs and Combined; the Callier Center, Signs and Combined; the Maryland School, Signs, Combined and Oral-Aural; Minneapolis oral classes, Oral-Aural and Gestures, and Minneapolis total communication classes, Signs and Gestures; the Rochester School, Fingerspelling, Combined and Oral-Aural and the St. Paul Program, Signs and Oral-Aural.

Teacher to Child

Teacher-child communication was observed most frequently in the New Mexico School (26.51) and least frequently in the Minneapolis oral classes (15.50). The Oral-Aural method, followed by Signs and Combined communication were the most frequently employed modes in teacher-child interaction (Table 27).

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Table 26

Classroom Observation Ratings of Communication Modes by Program
(Child to Teacher)

Program		Fingerspelling	Sign	Oral-Aural	Combined	Written	Gestures	TOTAL
American School for the Deaf		3.50	6.00	3.17	5.33	1.33	2.33	21.66
Callier Center for Communication Disorders		2.17	4.50	3.67	3.83	1.00	2.50	17.67
Maryland School for the Deaf		2.83	5.17	4.17	4.17	1.17	2.17	19.68
Minneapolis Public	(Oral)	1.00	1.00	5.50	1.00	1.00	3.50	13.00
School System	(TC)	2.00	5.00	3.50	3.50	1.00	4.00	19.00
New Mexico School for the Deaf		4.50	6.17	4.67	4.83	1.33	2.33	23.83
Rochester School for the Deaf		5.33	2.50	4.00	4.00	1.00	2.67	19.50
St. Paul Public School System		2.50	5.00	4.83	4.33	1.00	2.50	20.16
TOTAL		23.83	35.34	33.51	30.99	8.83	22.00	

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Table 27

Classroom Observation Ratings of Communication Modes by Program
(Teacher to Child)

Program		Fingerspelling	Sign	Oral-Aural	Combined	Written	Gestures	TOTAL
American School for the Deaf		4.33	6.33	4.67	6.17	2.17	2.00	25.67
Callier Center for Communication Disorders		4.00	5.33	5.67	5.17	1.00	2.67	23.84
Maryland School for the Deaf		4.00	5.50	6.00	5.00	2.00	2.00	24.50
Minneapolis Public School System	(Oral)	1.00	1.00	6.75	1.00	1.75	4.00	15.50
	(TC)	4.00	6.00	2.50	4.50	1.50	3.50	22.00
New Mexico School for the Deaf		5.17	6.17	5.50	5.67	1.83	2.17	26.51
Rochester School for the Deaf		6.17	2.17	5.50	5.17	1.00	2.33	22.34
St. Paul Public School System		4.00	4.83	5.33	5.00	1.33	1.83	22.32
TOTAL		32.67	37.33	41.92	37.68	12.58	70.50	

The most commonly used means of communication for the American School, Minneapolis total communication classes, New Mexico School and the St. Paul program were Signs and Combined communication. At both the Callier Center and Maryland School, Oral-Aural communication and Signs were most frequently employed by teachers. In the Rochester School the Fingerspelling and Oral-Aural categories rank first and second respectively. Teachers in the Minneapolis oral classes rely primarily on Oral-Aural communication and employ gestural communication secondarily.

Again this year there is a consistency in most frequently observed modes of communication across the three types of classroom interaction. This is the first year where teachers and children in all programs appear to be conforming to the methodology adopted by their particular program. However, some discrepancies in the implementation of these espoused methodologies should be noted. First, children in both the Rochester School and Minneapolis oral classes were observed signing to each other, and in the case of the Rochester School to teachers. Second, in no program employing manual communication was there a direct one-to-one relationship between oral communication and its manual counterpart. In all cases manual communication without verbalization, or more commonly spoken communication without an accompanying sign or fingerspelled word were noted.

Brown Parent Attitude Scale

The disposition and expectations of parents toward social and academic achievement are of great importance to the educational development of children. These attitudes and expectations may significantly affect educational progress and predict success in preschool and beyond. It is therefore of interest in the present study to examine changes which occur in parental attitude as the child becomes older. Will parents lower their expectations, or raise them? If there are changes, will they be a function of the child's success or failure? What role does the child's program play in the formation and change of parent attitudes?

In an attempt to measure these feelings, A Parental Information and Attitude Scale for Parents of Hearing Impaired Children (Appendix E) was again distributed to all parents in the sample for completion and return. Developed by Dr. Donald W. Brown at Gallaudet College, this scale is divided into three parts:

> Part I pertains to general information such as occupation, education, and information about various aspects of the child's hearing impairment.
>
> Part II is entitled, "Your Child Thirty Years From Now." It assesses parental expectations by having parents rate such statements as "will be a college graduate" on a five point scale from "very good chance" to "no chance at all."
>
> Part III consists of some typical statements and opinions about hearing impaired individuals. Parents are requested to circle the answer which best indicates their own feelings about that particular statement.

Twenty-seven families returned the completed questionnaires. Responses on this year's questionnaire were not evenly distributed across programs. Out of the total number of responding parents, 37% were from Callier, 19% from the Minneapolis programs, 14% from the Maryland School, 12% from St. Paul, 10% from the Rochester School, and 8% from the New Mexico School. No questionnaires were returned by parents from the American School.

Results

Part I: General Information: The general information, covering basic data on family socio-economic status and questions concerning the hearing impaired child, has remained relatively constant from year to year. Because of the minimal change in this information, the reader is referred to the 1970-71 EPHIC Report for data regarding the age of parents, their educational background, the persons initially contacted when hearing loss was suspected, articles and journals on hearing impairment read by parents, etc.

Part II: Your Child Thirty Years From Now: The data consisted of the number of parent responses to each of nineteen statements rated along a five point scale from "very good chance" to "no chance at all." The chi-square statistic (Winer, 1962) was employed to test for differences between the distribution of parents' responses in 1973 and 1974 and between the parents of children in oral and combined programs.

There have been no significant differences on individual statements from 1971 to 1972, from 1972 to 1973 or from 1973 to 1974. However in 1972 there was a definite shift toward more neutral responses, perhaps reflecting a trend toward realistic acceptance of the hearing loss by parents. Scores from 1973 and 1974 have stabilized near those of the previous year.

There were 12 statements in which the parents of children being instructed in oral and combined methods reflected modal agreement (the largest number of responses fell in the same category). The parents concurred that there was a "good chance" that their child would be a college graduate, drive a car, be close to his brothers and sisters, know his neighbors well, be in good health, depend on Speechreading more than his hearing, keep in touch with his parents, belong to an organization of deaf or hard of hearing, have speech that is easily understood by most people, and be married to a person with normal hearing. There was "a little chance" that he would read at about a sixth grade level or below and have difficulty using English correctly.

The chi-square statistic was applied to the remaining seven statements to reveal any significant differences in the pattern of responding between the two groups. Four statements reflected a significant difference in attitude between the combined and oral parents at the .01 and .001 levels of significance (Table 28).

Most oral parents felt there was a very good chance that their child would graduate from a regular high school while most combined parents felt there was little chance of this occurring.

The majority of combined parents felt that there was a good chance that the child will use sign language as his preferred means of communication and will use both oral and manual communication, while

Table 28

Your Child Thirty Years from Now: Significant Comparisons between Oral and Combined Parents

Statement	Chi-Square Statistic	df	Level of Significance
Will have graduated from a regular high school	$X^2 = 15.8$	2	$p < .001$
Will use sign language as his preferred means of communication	$X^2 = 23.5$	2	$p < .001$
Will use both oral and manual communication	$X^2 = 14.0$	2	$p < .001$
Will have more deaf friends than hearing friends	$X^2 = 9.3$	2	$p < .01$

oral parents felt this was unlikely. Combined parents thought there was a good chance that their child will have more deaf than hearing friends while oral parents felt that only some chance of this existed. Significant chi-square statistics are summarized in Table 28.

Part III: The data consisted of the number of parent responses to 14 statements, each containing 5 multiple choice answers. Instructions to the parents were as follows:

> Many statements and opinions have been expressed about hearing-handicapped people. We are interested in learning the reactions that you, as the parent of a hearing-impaired child, would have to the following statements. Please read each statement carefully. Circle the letter in front of the response which best expresses what you think of or would do about the statement.

Comparisons were made between the parents who responded in both 1973 and 1974. Responses for both years were similar. No significantly different distribution of responses were found from 1973 to 1974.

Chi-square comparisons were also made between all parents of children in combined programs and all parents of children in oral programs, regardless of whether or not they responded in 1973. Table 29 presents the statements on which both groups agreed. Table 30 presents the statements on which the two groups differed, followed by the most frequently chosen answer of each group. The comparison for the following three questions were significant at the .01 level:

> "2. Stuckless and Birch (University of Pittsburgh) report that their study has indicated that manual communication (sign language and fingerspelling) does not hinder the development of speech in the young deaf child. ($x^2 = 20.42$, $p < .001$)
>
> b. This is reassuring because I've wondered about that (combined)

d. They mean that this is true if the child has already developed speech before he is exposed to manual communication (oral)"

"12. We all have too little time. Because of this I should devote my short reading time to: (x^2 = 23.5, $p < .001$)

a. Books and articles whose authors know what they're talking about (oral)

c. Learning about methods of teaching the deaf which I disagree with (combined)"

"13. Most deaf people prefer to associate with other deaf people rather than hearing people. (x^2 = 24.5, $p < .001$).

c. I imagine this is true - they understand each other's speech easier (combined)

d. This is why deaf children should be taught with regular children (oral)

e. If they are happy doing this - that's fine (oral)"

Table 29

Questions on Which Parents of Children in Oral Programs and Parents of Children in Combined Programs Agree

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Question 3: There is so much disagreement about education of the deaf that the best thing to do is:

d. Realize that what seems to be best for others may not be best for my child

Question 5: Alexander Graham Bell said, "I think the use of sign language will go out of existence very soon.":

d. Bell would never have said that

Question 7: If a friend of mine discovered that her child was deaf:

e. I would feel obligated to share with her the satisfaction I have now that I've found the right program

Question 8: It is reported that many deaf adults who do not have intelligible speech are successfully employed and well adjusted:

b. This does not surprise me

Question 9: An oral teacher of the deaf claims that many deaf children can't learn to speak:

e. I agree - some can but many can't

Question 10: One of the disadvantages of getting together with other parents whose children are in my child's school is:

c. There are _no_ disadvantages

Question 11: A deaf adult says that he and his deaf friends don't think speech is very important:

c. Possibly he and his friends have found satisfactory adjustment without speech

Question 14: The primary function of an educational program of hearing impaired children is to:

d. Provide appropriate instruction in academic skills, i.e., reading, language writing

Table 30

Questions on Which the Modal Response of Parents of Children in Oral Programs and Parents of Children in Combined Programs Differ

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Question 1: Alexander Graham Bell, inventor of the telephone and strong supporter of teaching speech to deaf children, once said that fingerspelling was the fastest and most efficient way to teach language to deaf children:

a. I think he was probably right (combined)

b. This is interesting but probably needs some research to prove it or disprove it (oral)

Question 2: Stuckless and Birch (University of Pittsburgh) report that their study has indicated that manual communication (sign language and fingerspelling) does not hinder the development of speech in young deaf children:

b. This is reassuring because I've wondered about that (combined)

d. They mean that this is true if the child has already developed speech before he is exposed to manual communication (oral)

Question 4: Some people have said that many fewer deaf people than hearing people are able to go to college:

d. These people are talking about previous generations and are unaware of current progress (combined)

e. This seems quite logical to me (oral)

Question 6: Most deaf people marry a deaf person

b. If this is true, it is because of the communication barrier imposed by deafness (oral)

d. This is fine if it's what the deaf want (combined)

Question 12: We all have too little time. Because of this I should devote my short reading time to:

a. Books and articles whose authors know what they're talking about (oral)

c. Learning about methods of teaching the deaf which I disagree with (combined)

Table 30 continued

Question 13: Most deaf people prefer to associate with other deaf people rather than hearing people:

c. I imagine this is true - they understand each other's speech easier (combined)

d. This is why deaf children should be taught with regular children (oral)

e. If they are happy doing this - that's fine (oral)

Semantic Differential

A measure intended to systematically compare parent attitudes toward concepts related to deafness was designed using the semantic differential technique (Moores, McIntyre & Weiss, 1972). This principle involves rating a concept along a seven step scale between pairs of bipolar adjectives (sad-happy, etc.). The rationale and execution of the semantic differential are complex. The reader is referred to Osgood et al. (1957) for more detailed information and description of the semantic differential as a measurement tool.

It was hypothesized that the parents may differ along dimensions according to the program in which their child is enrolled. Presumably parents have certain attitudes towards various philosophies and methodologies of education either because they have chosen a particular program for their child, or because, through their involvement in their child's program, they have been convinced of the efficacy of a particular program's method. One important aspect of the study is to investigate changes in parental attitudes as the children progress through various educational systems.

The semantic differential scale sent to parents in 1971 was shortened and slightly modified for the 1972 and 1973 evaluation. The same form was used in 1974. The present semantic differential instrument measures attitudes towards the following concepts:

- Speechreading-Lipreading
- Hearing Impaired
- Sign Language
- Deafness
- Speech
- Hearing Aid
- Auditory Training
- Fingerspelling
- Integration of Deaf Child into a Hearing Class

The twelve pairs of bipolar adjectives were chosen on the basis of previous work by the senior investigator. Two minor changes were made in the adjective pairs used in the 1972 form. A sample of the semantic differential developed for the project is presented in Appendix F.

All parents of the sample of children received a copy of the semantic differential to be filled out and returned with the Brown Parental Attitude Scale. As in 1972 and 1973, the return of questionnaires was relatively small.

Results

The basic data consisted of the average of responses on all twelve adjective pairs for each concept. The higher the concept score, the more positive the attitude.

There seem to be no major changes in the attitudes of the parents from 1971 through 1974. Comparisons by t test were made between parents of children in oral programs and parents of children in combined programs. Both groups have similar attitudes toward the concepts of speech, speechreading, hearing aid, auditory training, deafness, hearing impaired, and integration of a deaf child into a hearing class. Parents of children in combined programs were significantly more positive toward the concepts of fingerspelling and sign language. These comparisons are summarized in Table 31. It remains evident that parents of children in combined programs do not perceive these programs as manual only. Speechreading, hearing aid, speech and auditory training all received positive ratings

Table 31

Concepts Showing Significant Differences Between Parents in Oral and Combined Programs on the Semantic Differential Measures

	Sign Language		Fingerspelling	
	Oral	Combined	Oral	Combined
N	13	33	13	38
$\overline{X}$	5.38	6.40	5.33	6.26
sd	.97	.64	1.02	.74
_t_	4.07**		3.46*	

$^*p < .01$

$^{**}p < .001$

equivalent to sign language and fingerspelling. All concept comparisons are depicted graphically in Figure 3. Little distinction is noted between the terms deaf and hearing impaired.

Parents of children in oral classes do not appear to view sign language and fingerspelling as negative. Their reactions tend to be neutral.

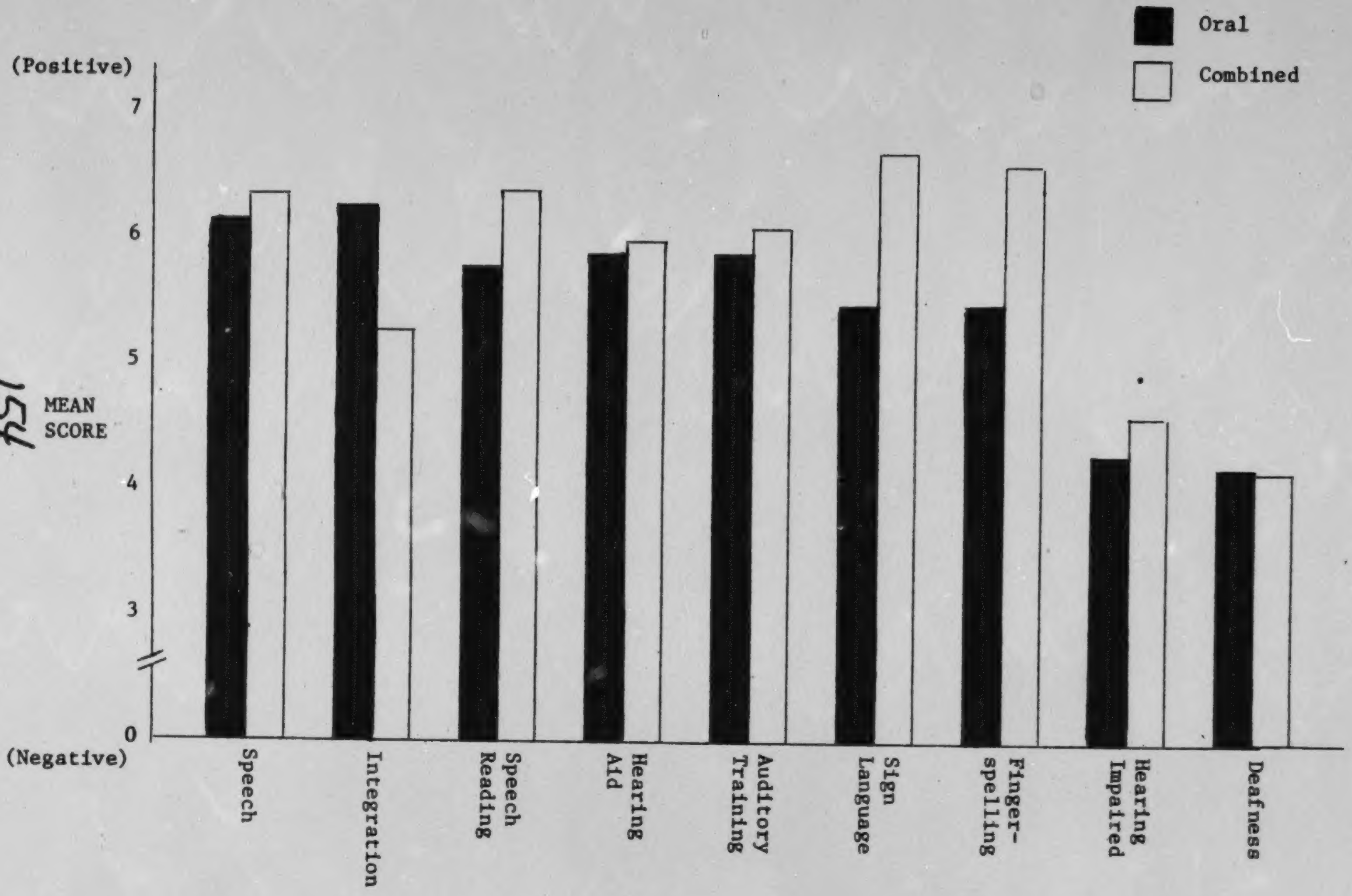

Figure 3. Semantic Differential Measure: Responses by Parents in Oral and Combined Programs

Regular Class Subjects

During the past four years, five children moved from their original programs and now have unique placement outside of the seven programs participating in this evaluation. It was decided to continue following each of the children in the hope of gaining insight into their continuing development.

Child A had transferred from the Minneapolis program in 1971 and is now in his third year as a residential pupil at the Minnesota School for the Deaf. This program is in transition from the Oral-Aural to Total Communication approach.

In 1971, Child B transferred from the Minneapolis program to a hearing nursery in another city, where he received support services from the special education division. As of September 1973 this child has been integrated into a hearing kindergarten in the same city where he participates in a thirty minute speech therapy session daily.

Child C was enrolled at the Callier Center during the 1971-72 school year and in the Minneapolis Public School Program for the 1972-73 school year. She is now integrated into a hearing kindergarten for half a day and spends the remainder of the day in a Total Communication preschool class in a rural Minnesota city.

In 1971-72, Child D was part of the Rochester School sample. He is currently enrolled in an Oral-Aural class for hearing impaired students within the Rochester Public School System.

Until December 1973, Child E was enrolled in the Minneapolis Program at which time he returned to his home district where he is integrated into a hearing first grade. The division of special services is providing speech therapy on a daily basis.

Test scores for subjects treated as individual case studies over the past four years are summarized in Appendix G.

In addition to these 5 children 14 others have been integrated into hearing classes either on a part or full time basis. The test data for these 14 children has been incorporated with data from their respective programs for analysis. Among the programs 55% of the Minneapolis sample, 67% of the St. Paul sample and 25% of the Callier sample have been placed in integrated situations as follows:

> Three children participate in a regular first grade class on a full time basis assisted by a teacher of the deaf within the classroom;
>
> Three children participate in regular and hearing impaired kindergartens, each on a half day basis;
>
> Eight other children participate in regular classes within their home districts and receive supplemental speech instruction.

For purposes of analysis, these 14 children along with Child B, C and E will constitute the group of subjects functioning in integrated settings.

In an attempt to identify characteristics of children functioning in regular class settings from those who have remained in classes for the deaf, statistical comparisons were made between these groups in the following areas: academic achievement (MAT), receptive communication, expressive communication, articulation, age and hearing loss. In addition, the distributions of children within the two groups by sex, etiology, age of onset of hearing loss and preferred mode of communication for the expressive communication scale were examined.

The two groups did not differ significantly on the basis of Metropolitan Achievement Test scores, Receptive Communication, Expressive Communication, sex, age, etiology or age of onset of hearing loss. The group of children who were integrated into classes for the hearing had significantly better hearing acuity ($\underline{t} = 5.0092$, $p < .001$) and achieved significantly higher scores on the articulation measure ($\underline{t} = 9.0309$, $p < .001$). All integrated children chose oral communication as their preferred mode during expressive communication scale videotaped sessions.

Longitudinal articulation scores of the two groups were further examined in an effort to trace the development of the articulation scores in the integrated group. It was found that in 1972, the first year articulation was measured, the integrated group scored significantly higher than the nonintegrated children ($\underline{t} = 5.9808$, $p < .001$).

This suggests that superior articulation of the integrated group was superior prior to integration.

Chapter 5

Discussion

The findings will be discussed following the order of presentation of results in Chapter 4. The reader is referred to that section for the tabular and narrative presentation of data.

Wechsler Intelligence Scale for Children (WISC) Performance (Table 7, Fig. 1)

The children appear to be functioning within the normal range. The overall performance IQ of 110.09 is somewhat above the hearing norm. The test has not identified any unique program differences that might add or detract from performance on other measures and the range of scores for the different programs reveals no significant differences. As predicted, the overall scores are somewhat lower than those obtained on the Leiter Performance Scale in 1970. This was expected because of a similar drop reported by Quigley (1969) on a sample of deaf children originally tested on the Leiter at age three and retested four years later on the WISC.

Illinois Test of Psycholinguistic Abilities (ITPA)(Table 8 , Figure 2)

The overall mean score of 180.65 indicates that the functioning of the young deaf children in the study on visual motor subtests of the ITPA is essentially normal. The overall predicted mean score for children with normal hearing would be 180. The mean scores of 179.96 in 1972 and 180.03 in 1973 for the same deaf children indicate strong stability over a period of two years and strengthen the conclusion that deaf children function at normal levels on the abilities tapped by ITPA visual-motor subtests. Because the results show a growth of two years of achievement over the period of two calendar years, there is evidence to suggest that the rate of growth is also normal. The relatively low score for the 1971 testing may be explained by the authors' early hypothesis that some subtests originally provided spuriously low estimates of deaf children's abilities because of fairly elaborate verbal directions and, in the case of Visual Closure, the use of timed tasks.

Scores by subtest present graphic evidence of the lack of differences between the deaf subjects and the hearing standardization population on four of five subtests. These results are the same as reported in 1972 and 1973. As in 1972 and 1973, the only statistically significant difference shows the deaf students to be superior in Manual Expression which, for the third consecutive year, was the only subtest in which the average score of children in each of the seven programs was above the hearing average of 36. The consistency of the results lends credence to the hypothesis, originally stated in the 1971-72 report, that deaf children, in developing mechanisms to cope with the environment, acquire superior skills in this area.

In examining scores by programs, it should be noted that the originally large range of scores among programs had decreased. Over the four years the average scores of the highest scoring programs remained relatively constant. The highest average program scores were 190.56 for Callier in 1971, 191.66 for St. Paul in 1972, and 187.50 for St. Paul in 1973. These programs remained highes in 1974, with the Callier group at 189.92 and St. Paul at 189.83.

Examination of the lowest average program scores presents a different picture. In 1971 Minneapolis at 159.95 had the lowest average score. In 1972 it continued to be lowest but the score had risen to 175.67, well within the normal range. By 1974 the average score for children in the program was 179.15, approximately ten points lower than Callier and St. Paul, but within one point of the hearing norm. This score placed the program at the median, fourth of seven programs, suggesting that the original non academic orientation of the program did not prevent the children from developing normal skills in those areas measured by ITPA visual-motor subtests.

In 1971 and 1972 scores on the ITPA were sensitive to the amount of academic cognitive content in a particular program. In 1973 and 1974 this sensitivity decreased, partly because all programs became more academic as the children matured. However the evidence suggests that those programs in which children consistently have been above the hearing norms are those which have had a consistent academic orientation from the beginning.

It was noted in the 1973 report (p. 106) that children in the Rochester program were lowest on the ITPA in 1973, yet earned the highest score on Piagetian-based tests of cognitive functioning. Although the average score of the Rochester children rose from 169.50 in 1973 to 173.12 in 1974, it was still relatively low. The children did not continue their superiority on the Piagetian tests, suggesting that their 1973 performance was spuriously inflated. This will be discussed in a following section.

In comparing the ranking of ITPA scores with receptive and expressive communication scores, some discrepancies are evident, especially for Callier and Maryland. Children in the Callier program do relatively better on the ITPA than on the communication measures. This may be explained, at least in part, by the fact that many of the daily activities in the Callier program are based on tasks similar to those found in the ITPA. In general, it is reasonable to conclude that the visual-motor skills measured by the ITPA do not appear to be highly related to person-to-person communication among young deaf children.

Metropolitan Achievement Tests (MAT) Primer Battery (Table 9)

Academic achievement of the sample, as revealed by the MAT Primer Battery, Reading and Arithmetic Subtests, appears to be comparable to those of hearing children of approximately the same age in the area of reading and below those of hearing counterparts in the area of arithmetic. These findings are consistent with those reported in the 1973 study, employing the Metropolitan Readiness Test, which found that the deaf children scored significantly higher on the reading related tests of Matching and Alphabet while their performance on the Numbers test was significantly lower than that of the standardization sample. At that time it was postulated that the relatively poor performance on the Numbers test could be attributed, at least in part, to the fact that all questions were presented verbally.

Although the verbal nature of the MAT Arithmetic subtest may still account in part for the relatively poor performance of the deaf subjects on computational tasks, this second year of data lends further support to indications that perhaps the children are functioning ing below their hearing counterparts in the area of Arithmetic. At this point the programs appear to be emphasizing the development of reading rather than computational skills.

Although the children appear to be developing reading skills comparable to hearing children now, it must be reemphasized that none of the programs has succeeding in developing English language skills comparable to those of hearing children. Results of our tests on expressive and receptive communication indicate that the children in the sample experience difficulty with complex grammatical structures. Even though they possess adequate pre-reading skills, it is predicted that as they became older and reading content includes more complex linguistic structures (e.g., passive, negative, interrogative construction) the scores of these children, relative to the hearing, will decline.

In terms of programmatic scores, there appear to be two clusters for both the Reading and Arithmetic raw scores. In each case the top cluster is made up of five programs (the American School, Maryland, New Mexico, Rochester and St. Paul) with program scores for Reading ranging from 26.00 (American School) to 29.50 (Rochester) and for Arithmetic from 20.17 (American School) to 23.25 (Maryland).

In each case the bottom cluster consists of Callier and Minneapolis with Reading scores of 23.92 and 22.69 and Arithmetic scores of 17.50 and 17.15 respectively. The low scores reflect the less academic orientation of both programs in earlier years, especially for Minneapolis, and suggest that children in these programs may experience great difficulty in the future in closing the academic gap.

Communication Battery

Receptive Communication, Core Items (Tables 10-12)

In terms of relative efficiency across modes, the results were identical to those reported in 1972 and 1973 with the exception of the Printed Word. Excluding the printed word, children received communication most efficiently when presented simultaneously through Speech and Signs (88%), followed by simultaneous Speech and Fingerspelling (75%). The most inefficient means was Sound Alone (44%), i.e., when the child had to rely on hearing alone, without the benefit of visual clues. The addition of speechreading improved scores to 68%.

Consistent with the 1971-72 and 1972-73 results, it appears that the addition of each dimension, Sound plus Speechreading plus Fingerspelling plus Signs adds an increment of intelligibility. In corroboration of previous results, it is also apparent that the use of manual communication does not detract from oral receptive skills.

Table 11 indicates an increase in receptive communication scores from 1972 to 1973 to 1974. The smallest gains from 1973 to 1974 are noticed in the Sound Alone subtest. Scores may be reaching a ceiling when signs are used, especially in Maryland, New Mexico and St. Paul, where scores were above 90% correct.

The greatest improvement was noted in the Printed Word subtest in which scores increased from 38% in 1972 to 56% in 1973 to 76% in 1974. This reflecting continued emphasis in the development of pre-reading and reading skills, and supports the original decision of the authors to treat understanding of the printed word separately from the other four subtests, which are more measures of person-to-person interaction.

It is interesting to observe that program scores on the Printed Word subtest cluster in exactly the same way as Reading and Arithmetic scores on the MAT: The top five programs are the American School, Rochester, New Mexico, Maryland and St. Paul with scores ranging from 90% down to 77% correct. The lower cluster, as in the MAT scores, is comprised of Minneapolis with 65% and Callier with 64%. Again, the results suggest that programs with little initial academic orientation face difficulties in the later academic achievement of their children.

Examination of Table 10 reveals a number of interesting patterns across programs and the four person-to-person modes of communication, suggesting that the relationship between methodology and communication effectiveness is highly complex.

Beginning with the Sound Alone subtest, it may be seen that Minneapolis (58%) and St. Paul (53%) children scored far higher than those in the other five programs, where scores ranged from 34% to 40%. A similar pattern was reported in 1973, when St. Paul ranked first, Minneapolis second and the other five were clustered at a much lower level. The reasons for the consistent superiority of the

Minneapolis and St. Paul children on use of residual hearing are not readily apparent because the programs differ in methodology, philosophy and orientation. Aside from geographic propinquity, the only shared characteristic is the fact that they are the only two programs in the study that are incorporated in public schools. The differences cannot be explained by integration or placement contiguous to hearing peers because the majority of the Minneapolis children and half of the St. Paul children are in self-contained classes. Also, methodology is not a factor because all of the St. Paul children started with the Rochester Method and later were exposed to signs. All of the Minneapolis children started with an oral-aural method. The authors conclude that the superiority is explained by superior techniques and more intensive attention to auditory training and aural rehabilitation in these programs.

The addition of speechreading to sound presents a completely different rank in program effectiveness. In terms of the oft-repeated goal of "communicating with the hearing world" this subtest is the most significant indicator because it approximates the task typically facing a deaf individual attempting to understand the message of a hearing individual, i.e., the deaf person directly faces the hearing person and makes use of residual hearing and speechreading simultaneously. In this context, the Sound Alone subtest provides little information on actual person-to-person communication abilities.

Although the overall average score rose from 44% for Sound Alone to 68% for Sound and Speechreading, there is great diversity in the amount of improvement from program to program. In terms of efficiency there appear to be three groupings: St. Paul (90%) and Rochester (83%) are at the top; Minneapolis (67%), Callier (65%) and Maryland (65%) are in the middle; the American School (53%) and New Mexico (51%) are at the bottom. One immediate and obvious conclusion is that early manual communication does not hinder oral receptive skills, since children in the two top programs have used manual communication; the St. Paul children from the beginning of the study and the Rochester children for the last two and one half years of the study. Conversely, it is obvious that early manual communication, per se, does not automatically facilitate oral receptive skills, since children in the bottom two programs have used manual communication.

Analysis of scores program by program suggests that much more is involved than just oral-manual considerations. For example, the greatest improvement from Sound Alone to Sound and Speechreading was registered by children in the Rochester program, whose scores rose from 35% to 83% correct, an increment of 48%. The least improvement of only 9% was found in the Minneapolis group, whose scores rose from 58% to 67%. The scores of the Rochester children suggest a strong visual orientation in the program which, to some extent, compensates for insufficient attention to auditory processes. The scores of the Minneapolis children, conversely, reflect a strong auditory orientation and an inadequate visual one. The second largest program increment was recorded by the St. Paul children, who improved 37%, from 53% for sound alone to 90% for Sound and Speechreading. In this case the scores appear to reflect strength in both auditory and visual components.

The addition of fingerspelling reflects further patterns and interrelationships. The overall improvement of 7% of Sound and Speechreading (68%) with the addition of Fingerspelling (75%) is an underestimate because of two factors. The score of 55% for Minneapolis reflects performance of a small number of children who were exposed to manual communication in the classroom during the last year of the study. These were children who were judged as not progressing satisfactorily in an oral-only class who had scored below norms consistently over the survey. The children in the Callier program were switched to a Total Communication system with a year and a half to go in the study. The program utilizes a SEE (Seeing Essential English) system of signing which places little reliance on fingerspelling. An additional consideration is the near perfect score of the St. Paul children (97%), indicating they have reached the ceiling for the test.

For the above reasons, this subtest contains a greater range of scores than any of the others. The score of 97% correct for St. Paul is the highest for any program on any subtest. The fact that even integrated children score high on this test -- and higher than they had in 1973 -- suggests that they may continue to utilize simultaneous oral-manual communication in some situations.

The addition of fingerspelling elicited the greatest proportional increases in New Mexico (51% to 80% for a 29% increase) and the American School (53% to 77%, for a 24% increase). However, scores in both programs remained below those of St. Paul and Rochester. Since these were the two lowest programs on Sound and Speechreading, it appears that less emphasis is given to oral-aural skills than to manual.

As noted previously, the simultaneous use of sound and speechreading and signs is most efficient with an overall score of 88% correct. New Mexico (94%), Maryland (93%) and St. Paul (93%) approach the ceiling for the test and even the "non-oral" children in Minneapolis score at 85% although only recently exposed to signs in the classroom. The lowest scores, 83% for the American School and 80% for Callier, still are high relative to other modes.

Receptive Communication: Negatives, Passives, Verb Tenses (Tables 13-15)

Although scores on the receptive communication core items suggest consistent improvement in program functioning over a three year period, the most difficult linguistic constructions typed are of the Subject-Verb-Object or Subject-Verb-Prepositional Phrase types that are active declarative sentences addressed to the present. In view of the extensive literature documenting the difficulties that most deaf children encounter in comprehension of verb tense, passive voice and other complex constructions, the present study also included measures of this type.

The results are less promising than those found for the core items and suggest that all programs need to devote more attention to mastery of various English structures.

Analysis of error patterns reveals the discouraging finding that deaf children chose the reverse interpretation of negatives and passives more frequently than they chose the correct one. For example the overall percentage of correct responses for passives was 29% with subjects choosing the reverse (incorrect) interpretation of the passive sentences 47% of the time (Table 14). It appears that deaf children frequently employ the active interpretation of passive phrases and ignore the passive marker "by."

Similarly, the overall percentages of correct responses for negatives was 36% with subjects choosing the incorrect positive interpretation of the negative 46% of the time. The children tended to ignore negative cues and select the opposite meaning more frequently than the correct one.

The results obtained are similar to those obtained by Power (1971) and Schmitt (1969) who in studying deaf children between 8 and 18 found deaf children tended to ignore linguistic markers and typically processed sentences as active declaratives. This situation is doubly serious. Not only do deaf children commonly fail to interpret passive sentences and negative sentences but they frequently derive information which is the opposite of that which was intended.

The same pattern is clear with regard to verb tenses. The overall score of 39% is close to the chance level of 33%. It appears that the majority of subjects do not recognize basic verb tenses consistently.

The Printed Word tended to facilitate recognition of both negatives and passives, but not necessarily tenses. It appears that complex constructions are introduced to the children primarily through print and that they are not employed consistently in face to face communication whether it be oral-only or combined oral-manual. The results lead the authors to believe that adequate mastery of these components of the English language will not be achieved unless the programs consciously address themselves to developing specific activities in which the children have the opportunity to practice different basic constructions of English. This statement holds regardless of method (oral-only, etc.) utilized.

Expressive Communication Scale (Tables 16-18)

The results of the expressive common communication component represent the most complex aspect of the survey. The results presently are being analyzed for linguistic content, semantic content, mode of expression and understandability, as a function of the status of raters (deaf adult, hearing adult, hearing adult proficient in manual communication). The results are extensive enough and the implications important enough to be treated intensively in a separate monograph on which initial work has begun.

In general terms, as expected, interpreters made more correct identifications (56.66%) than Deaf Adults (31.41%) and Graduate Students (19.54%). By program children in Maryland were highest (45.11%) followed by New Mexico (34.50%) and the American School (33.36%), with St. Paul (31.15%), Minneapolis (30.61%) and Callier (29.90%)

for Rochester are not considered since tapes from only four children could be used due to equipment difficulties, and even for those children the tapes were defective.

It is interesting to analyze the preferred mode of communication by children in different programs on the expressive communication battery (Table 18). The most common mode was total communication (simultaneous oral-manual), n = 18, followed by oral, n = 17. The variation within programs as well as between programs is extensive. Discrepancies with a program's espoused methodology were most noticeable in Rochester, where only one of four children employed the Rochester Method and Minneapolis where four out of 13 children used some form of manual communication, which had been forbidden prior to 1973-74.

Articulation Measure (Tables 19-20)

The authors must again emphasize that scores on the articulation test do not represent measures of language per se. They are ratings of single words uttered in isolation and the authors are unwilling to project these scores to spoken, written, fingerspelled or signed language.

Examination of Table 19 indicates that children in Minneapolis (65%) and St. Paul (60%) score higher than children in the other five programs, which recorded scores from 21% to 29% understandable. The situation is similar to that of the Sound Alone subtest of the Receptive Communication Scale in which children from the above two programs were superior. The identical results were also obtained in 1973 suggesting again that the two programs have superior speech and aural rehabilitation components.

Overall scores on this test appear to fluctuate across programs independent of other communication abilities, measures of achievement, and measures of intellectual functioning. Scores seem purely to reflect the amount of attention programs pay to speech per se. It should also be noted that the range of scores within programs was great. In each program, including Minneapolis and St. Paul, there were children who were almost completely unintelligible, leading to the conclusion that no program is developing adequate articulation skills in all children.

Cognitive Development Measures (Tables 21-22)

The results of the Piagetian-based Cognitive Development Measures reflect no differences between programs, with scores ranging from 32.2 to 33.8 (Table 21). The measures no longer discriminate among programs or children. In 1973 the Rochester children who had participated in a "Piagetian" based preschool training program were superior on this measure. At that time it was suggested that their superiority on cognitive based tasks did not appear to generalize to performance on other tests with similar bases. Because the children in other programs now achieve at the same level, our conclusion is that the earlier Rochester superiority was due to task familiarity and that the type of activities utilized has no effect on the development (or unfolding) of abilities in this area.

Correlations of Cognitive Development Measures with other measures (Table 22) reveal, however, that an individual's functioning is related to functioning in other areas. As might be expected scores on the Seriation task are significantly correlated (p < .01) to the MAT Numbers subtest. Scores on Classification are correlated with total Receptive Communication Scores (p < .01) and total ITPA scores (p < .001). Interestingly enough, none of the scores are correlated significantly with the MAT Reading subtests.

Classroom Observation (Tables 23-24)

In total classroom observation scores New Mexico, Maryland, and Rochester scored significantly higher than St. Paul and Minneapolis. The American School, Callier, and even St. Paul were significantly higher than Minneapolis. Significant program differences were found in the following categories (Table 23): Encouraging Language and Speech Development, Reacting to Pupil Needs, Classroom Relations, Structuring Program. In each case scores for the Minneapolis program were lowest.

Results are similar to 1973 when New Mexico and Maryland were highest and St. Paul and Minneapolis lowest. In 1972 New ~~Mexico~~, St. Paul and Maryland were highest. The 1972 evaluation reported that the St. Paul program appeared clearly to be the most consistently effective across all measures (p. 93). This was not the case in 1973 or 1974. Its drop in rank for overall classroom observation apparently reflects a change in emphasis which also appears in other measures.

For the second year in a row St. Paul and Minneapolis were rated lowest in Encouraging Language and Speech Development, while at the same time scoring higher than other programs on the Articulation measure. In 1973 it was suggested that the programs perhaps were concentrating on articulation per se. Such seems to be the case for 1974.

Communication Mode by Program

Examination of Tables 25, 26 and 27 reveal a great variety in the amount and type of communication that takes place. This is explained by the different modes of communication employed and by differences between programs regarding their philosophy concerning task oriented behavior and personal interaction.

Child to Child (Table 25). The total amount of child to child interaction ranged from a low of 14.00 in Minneapolis (oral group), also lowest in 1972 and 1973 to a high of 21.26 in New Mexico. For the second year in a row the most common modes were Sign (35.59), Oral-Aural (27.90) and Combined (27.17), each mode being observed more frequently in 1974 than 1973. The frequency of Gestures decreased (30.75 in 1973, 25.00 in 1974), except for Minneapolis where the amount increased from 4.17 to 4.50. Gestures were also relatively frequent at Rochester (3.17) and Callier (3.33) suggesting that when children do not have formal signs at their disposal, they must resort to gestural communication to some extent. The greatest overall increase was observed in Fingerspelling (13.99 to 19.96), which became the most common mode of communication in Rochester (4.63), replacing Gestures. It was also frequently observed in New Mexico. A decrease at the American School (3.33 in 1973, 2.17 in 1974) suggests a trend away from fingerspelling and perhaps greater reliance on signs.

Child to Teacher (Table 26). Again there was a wide range in the amount of interaction. As in child to child communication, interaction was noted most frequently in New Mexico (23.83) and least frequently in Minneapolis (oral), which was also lowest in 1972 and 1973.

The overall amount of communication has increased from 1973 to 1974. The most common mode in 1974 was Sign (35.34) followed by Oral-Aural (33.51) and Combined (30.99). Oral-Aural communication, with signs or fingerspelling, was observed frequently in all programs and was the preferred mode of communication with teachers for many children, regardless of program philosophy. The use of gestures was the only category in which a decrease was noted (26.24 to 22.00). With the exception of Minneapolis, in which there was an increase of gesturing, it is becoming relatively infrequent. The greatest categorical increase is in Fingerspelling (16.49 to 23.83) and was most common in Rochester (5.33) and New Mexico (4.50). Apparently fingerspelling becomes more common as children mature and develop expressive language abilities.

Teacher to Child (Table 27). Again there is a wide variety in the amount of communication and again it is most common in New Mexico (26.51) and least common in Minneapolis (oral) (15.50), which was also lowest in 1973. The most common means of communication continues to be Oral-Aural (41.92) followed by Combined (32.68) and Sign (37.33). Reliance on Gestures has dropped markedly (28.00 in 1973, 20.50 in 1974) except in Minneapolis, where their use has increased.

Consistent with child-child and child-teacher interaction, the use of Fingerspelling has increased (26.5 to 32.67) and is used most frequently in Rochester (6.17) and New Mexico (5.17). Writing continues to be employed sparingly.

Total Classroom Interaction. A number of emerging patterns may now be discerned. For the second year there is a consistency in the most frequently observed modes of communication across the three types of classroom interaction. In addition, this is the first year that all programs appear to be conforming to the methodology officially adopted by their programs. Some earlier discrepancies, for example, were found in Rochester and Callier. When the Rochester Program decided to change from an Oral-Aural to a Rochester Method program in 1971-72, more of the preschool teachers were competent in the Rochester Method. Until well into the 1972-73 year instruction was actual oral-aural with occasional fingerspelling. A similar situation was faced in Callier which was originally Oral-Aural and then in 1972-73 changed some children to Total Communication and in 1973-74 changed the entire program. Again teachers were obligated to learn the new system as they taught. Examination of teacher-child communication patterns reveals there is no "pure" program; perhaps there should not be. In programs endorsing simultaneous oral-manual communication, this category tends to be most frequent but is followed closely by Oral-Aural communication by itself (American School, 4.67; Callier, 5.67; Maryland, 6.00; New Mexico, 5.50; Rochester, 5.50; St. Paul, 5.33). Obviously then, teachers do not sign and spell everything they say.

Other discrepancies may be noted in children's modes of communication. First, children in both the Rochester School and Minneapolis oral classes were observed signing to each other, and, in the case of Rochester, to teachers (Signing was also observed from teacher to child in Rochester). Secondly, in no program was there a direct one-to-one relationship between oral communication and its manual counterpart. In all cases, spoken communication without an accompanying sign or fingerspelled word or, less frequently, manual communication without verbalization were observed. In this context, the flexibility of the children is impressive. They appear to have three modes of communication at their disposal: Oral-Aural, Simultaneous Oral-Aural Manual, and Manual. Although there is more of a tendency to use the Oral-Aural with teachers (most of whom hear) and the Manual with classmates, the children apparently make the switch with little or no difficulty.

The evidence over four years strongly indicates that reliance on an Oral-Only system greatly limits all aspects of communication--child-child, child-teacher, and even teacher-child. Both children and teacher are forced to develop a gesture system to the extent that the program, much as it may be denied, evolves an oral-gestural system. In the course of the study, when programs changed from an Oral-Aural to Total Communication, dramatic increases in classroom interactions were noted. The most impressive evidence was provided by the decision of Callier in 1972-73 and Minneapolis in 1973-74 to place a small number of "non-oral" low communicating children in

Total Communication classes. By the spring of 1973 the Callier children in the Total Communication Classes were participating in child-child, child-teacher and teacher-child interaction more frequently than the Oral-Aural children. All children were changed to Total Communication for 1973-74. The "non-oral" Minneapolis children placed in Total Communication classes in 1973-74 scored above the "oral" children in Child-Child Communication (18.00 to 14.00), Child-Teacher Communication (19.00 to 13.00), and Teacher-Child Communication (22.00 to 15.00). The differences in Teacher-Child is especially impressive.

Parent Attitudes

Because the proportion of parents responding is relatively small, the extent to which replies may be generalized is questionable and the results must be treated tentatively.

Brown Parent Attitude Scale (Tables 28-30)

Reactions of parents from 1971 to 1973 showed a trend toward more neutral and more realistic attitudes. To a large extent parents of children in oral programs tended to react more and more as parents of children in combined programs. For example, they originally believed (1971) that the major goal of an educational program for the deaf was to develop speech and speechreading skills, but in 1972 and 1973 they came to agree that the major function should be the provision of instruction in academic skills, i.e., reading, language and writing. By 1973 the differences which remained were concerned primarily with educational placement and desirability of manual communication.

Differences appear to be somewhat greater in 1974. Parents of children believe to a greater extent that their children will graduate from a regular high school, will not prefer sign language, will not use both oral and manual communication and will have more hearing than deaf friends. The parents of children taught by Oral-Only methods now represent a minority of the survey and many reflect a more "hard core" group.

Semantic Differential (Table 31, Figure 3)

Results are similar to 1972 and 1973. Parents of children in combined programs tend to perceive speech, speechreading, hearing aid, auditory training, sign language, and fingerspelling as good, relatively equivalent concepts, obviously viewing their children's programs as oral-manual and not oral-only or manual only.

Parents of children in oral programs react similarly. The only significant differences are in responses to fingerspelling and sign language, which they regard as neutral to good, but not good to the same degree as that noted by parents of children in combined programs.

Both sets of parents continue to view deafness and hearing impaired as equivalent terms. The results indicate little change in attitude over the past two years.

Regular Class Subjects

The question of integration has received growing attention because of recent widespread interest in the trend toward "mainstreaming" handicapped children. On the basis of the information available from the present study, integration appears to be an administrative device with little impact on children served.

For the children studied integration does not appear to promote or hinder academic achievement. Neither does integration appear to be based on academic performance or achievement as measured by Metropolitan Achievement Tests scores.

Integrated children seem to be those children who most nearly approximate the "norm" (better speech, hearing aids kept inconspicuous). There are no obvious physical differences between the hearing and the hearing impaired children. Speech is one of the most tangible physical abilities and integrated children approximate hearing children in this respect. Unfortunately, there is little evidence that regular classrooms make any effort to accommodate deaf children with less intelligible speech, even if they are high achievers academically. The situation remains as it always has. If the child does not or cannot adjust to the school, he is not accepted.

It is interesting to note that the only difference between integrated deaf children and those in self-contained classes is articulation. Integration decisions are made on the basis of hearing loss and speech abilities alone. Those who were integrated were speaking more clearly in 1972, before integration. Thus, it must be emphasized that children do not speak better because they are integrated. Rather they are integrated because they speak better.

Overall Program Effectiveness

As outlined in the original statement of purpose for the project (Moores, 1970b), the objective was not to identify the "best" program which might serve as a model for all others. Rather it was anticipated that, as the study progressed evaluation would become more and more complex and analyses would concentrate increasingly on interactions between various types of treatments and outcomes.

The authors believe the programs involved in the evaluation represent seven of the most effective programs in the United States. It is apparent that each has areas in which it is outstanding and each has areas in which there are relative weaknesses. Remaining cognizant of this, the authors ranked the programs from most effective (11) to least effective (7) on ten separate areas measured in the study (Table 32). The only measure not included was the Cognitive test in which the range of scores between programs was less than two points and there was no program differentiation.

The programs with the lowest scores, and therefore most effective across all measures were New Mexico (30), Rochester (31), Maryland (33) and St. Paul (34). Scores were close enough so that no one really exhibited clear superiority. However examination of patterns reveals that each program did relatively poorly in one area or more. Also, even the least efficient program, Minneapolis, which was last on six of ten measures did well in the one area of Articulation.

During 1975 the authors will be analyzing the results, program by program and measure by measure. A final report covering the complete project from 1969 to 1975 will be published late in the fall of 1975. It is projected that the results will form the basis for suggested guidelines for preschool programs for the hearing impaired.

Table 32

Program Ranking by Category[1]

Program	Category										
	ITPA[2]	MAT[3] Reading	MAT[3] Arithmetic	MAT[3] Total	Receptive[4] Communication Printed Word	Receptive[4] Communication Total	Articulation[5]	Expressive[6] Communication	Classroom[7] Observation	Classroom[8] Interaction	Total
New Mexico School for the Deaf	3	2	4	4	3	4	6	2	1	1	30
Rochester School for the Deaf	6	1	2	1	1	2	4	7	3	4	31
Maryland School for the Deaf	7	4	1	2	4	3	4	1	2	3	33
St. Paul Public School System	2	3	3	3	4	1	2	4	6	6	34
American School for the Deaf	5	5	5	5	1	4	7	3	4	2	39
Callier Hearing and Speech Center	1	6	6	6	6	7	3	6	5	5	51
Minneapolis Public School System	4	7	7	7	7	6	1	5	7	7	59

[1] Rated from highest (1) to lowest (7) in relation to all seven programs.

[2] Table 8

[3] Table 9

[4] Table 10

[5] Table 11

[6] Table 16

[7] Table 24

[8] Table 25-27

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APPENDIX A

Program Sample Days

Sample Day - American School for the Deaf

Submitted by V. Richards

PREPARATORY CLASS - DAILY SCHEDULE

9:00 - 9:15

Greetings. Children put on individual EFI equipment. Helpers take care of their individual tasks, which are changed daily. These include feeding the pets, watering flowers, checking attendance (child indicates on attendance slip if all children are present by writing "all Here" or "O.K." or name of child or children who are absent.) Prayer. Salute.

9:15 - 9:45

Conversation time. Children are encouraged to share news or posessions. They express their ideas and are helped to express themselves using proper language structure. Early in the year, the news is written by the teacher. Then one of the child's sentences is written on a sentence strip, and after discussion, is cut into words and/or phrases and the child is encouraged to reassemble it in the proper order. From this the children progress to writing a sentence independently on the board. Language skills are informally stressed at this time, - awareness of nouns, verbs, where and when phrases, appropriate pronouns, possession, plurals, etc.

9:45 - 10:15

Independent seat work. One activity is writing daily news in the third person and being able to make the appropriate language changes depending on the sentence.

Children are free to select an activity of their choice when required work is finished. Activities include table games, operating and watching movie cassette machine and film strip projector, Project Life machine, woodworking, etc. Children are expected to respond to material. Care is taken that child does not select the same material daily.

Teacher works independently with children daily on speech correction. Speech is encouraged during all activities and lessons.

10:15 - 10:30

Recess

10:30 - 10:45

Snacks. One child is host or hostess for the day. He/she sets the table, pours milk, passes cookies, leads prayer. Manners are stressed. General T. C. communication is encouraged. Sesame Street program is available if the activity is one in which the children are interested, e.g., alphabet, numbers, etc.

10:45 - 11:15

Reading. Scott Foresman Reading Series is used. Children are tested and grouped according to ability. The child joins a group based on his level and is often with children other than his regular class.

11:15 - 11:40

Math activities.

11:40 - 12:00

Auditory training or specific language skills.

12:00 - 1:00

Lunch and play.

1:00 - 2:30

Tuesday - Thursday "Mini-courses" are conducted on these days. The children go to three half-hour classes each day. Schedules are changed mid-year to allow each child to participate in a variety of activities. Courses include: Weaving, Art, Science, Health & Safety, Sewing, Fine Motor, Board Games, Typing, Woodworking, Indoor Games, Gym, Practical Living & Manners, Cooking, Acting and Library.

Gym is individualized for each child based on his needs.

1:00 - 2:00

Monday - Social Studies activities.

2:00 - 2:30

Gym

1:00 - 1:30

Wednesday - Gym

1:30 - 2:00

Art

2:00 - 2:30

Social Studies - or free play

2:30 - 2:45

Review day's activities. Discuss activities of next day. Child is responsible for taking care of EFI - plug in to charger, etc.

2:45 - Dismissal - Children are dismissed at 1:00 p.m. on Fridays. Teachers spend Friday afternoons participating in in-service programs.

Sample Day - Callier Center for Communication Disorders

Submitted by Mattie August

8:30 - 10:00	Language Calendar work News Experience stories Writing	Tuesday and Thursday
8:30 - 9:30	Thinking Skills (with another teacher)	Monday, Wednesday, & Friday
10:00 - 10:20	Recess	
10:30 - 11:30	Language (Drill)	Monday, Tuesday, Wednesday, Thursday
	Two different groups - 30 minutes allowed for each group. The group that is not involved in a group lesson with teacher works on his contract assignments.	
10:30 - 11:30	Basic skills -	Friday only
11:40 - 12:15	Lunch	
12:25 - 1:15	Reading	Daily
	25 minutes for each group following same procedure as for language.	
1:15 - 1:30	Recess	
1:30 - 2:10	Math	Daily
2:10 - 2:30	Finish contract assignments	
2:40 -	Dismissal	

Sample Days - Callier Center for Communication Disorders

Submitted by Charlotte Smith

DAILY SCHEDULE

M W F

8:30 - 8:45	Take roll and lunch money - test hearing aids
8:45 - 9:00	News primarily for emphasis on past tense
9:00 - 9:20	Language group
9:20 - 10:00	Writing and spelling
10:00 - 10:30	Play
10:30 - 10:45	Reading
10:45 - 11:00	Math
11:00 - 11:30	Gross motor or continuation of reading and math Gross motor one day a week
11:30 - 11:40	Clean up for lunch
11:40 - 12:15	Lunch
12:15 - 12:35	Play
12:35 - 1:35	Science
1:35 - 2:30	Basic skills

T Th

8:30 - 8:45	Same
8:45 - 9:00	Same
9:00 - 10:00	Same
10:00 - 10:30	Play
10:30 - 11:30	Same
11:30 - 11:40	Clean up for lunch
11:40 - 12:15	Lunch

12:15 - 12:35	Play
12:35 - 12:50	Rest with lights out
12:50 - 1:15	Story time
1:15 - 1:45	Creative arts
1:45 - 2:10	Auditory Training
2:10 - 2:30	Gross motor games

Sample Day - Callier Center for Communication Disorders

Submitted by Jacque Waller

8:30 - 9:00	Morning discussion - calendar work
9:00 - 9:30	Story or small language experience
9:30 - 10:00	Speech and phonics, review or oral work, connected reading
10:00 - 10:30	Language chart or large experience
10:30 - 11:00	Recess
11:00 - 11:40	Lunch
11:40 - 12:00	Rest period
12:00 - 12:15	Songs and language games and rhythm
12:15 - 1:00	Basic skills Frostig - Perceptual Skills Visual reception memory
1:00 - 1:40	Math and number work
1:40 - 2:15	Gym
2:15 -	Dismissal

Sample Day - Callier Center for Communication Disorders

Submitted by Gaye Disheroon

8:30 - 8:45	Children check their own hearing aid batteries Specific language work: 1) review of past experience stories using charts. Child discriminates using Total Communication, speech reading alone and audition alone. Drill on expressive language. 2) drill on questions sometimes from a story or a particular situation 3) introduction of new language and concepts, i.e., opposites, sweet, sour, and salty

While teacher is working with a small group the other children, 3 or 4, go out to a Basic Skills area and spend their time with a teacher and teacher aid on basic skills.

10:00 - 10:30	The two groups change at this time and teacher does same type of activities with the other group. The groups are divided according to expressive and receptive language skills and activities may vary because of this.
10:30 - 11:00	Free play period outside, get ready for lunch
11:00 - 11:40	Lunch period
11:40 - 12:15	The group that was in the classroom from 10:00 - 10:30 return to the classroom and others to basic skills.
12:15 - 12:30	Rest period
12:30 - 1:30	Children alternate between working with the teacher and teacher aid. While with the aid they practice writing skills, print recognition, math workbooks, and activities related to work the teacher has done.

During this time the teacher works with children individually or in groups of 2 on speech work (taken from vocabulary and more recently a phonics approach) and on reading readiness activities. The children have a group of reading stories which they are drilled on for recognition and comprehension. This time is also devoted to any special problems a child may be having. This time is also used for experiences.

1:30 - 1:45	Story time Nursery rhymes Songs Art
1:45 - 2:15	P.E.
2:15 - 2:25	Ready for dismissal
2:30 -	Dismissal

Sample Day - Maryland School for the Deaf

Submitted by Mr. William Sherman

A typical day for a primary student starts with waking up at 6:30 a.m. The child then washes up and prepares himself for the day. The dorm is a group type dormitory that consists of a large room in which there are usually 15 to 20 beds and individual closet-bureau combinations. At 7:20 a.m. the children eat breakfast in the school dining facility. The meal, as are all meals for the primary, ~~are~~ family style. Approximately 10 to 12 children sit at a table with one houseparent. After breakfast they return to the dorm where they have either recreation or clean up time before classes start at 8:00 a.m.

The major emphasis on academics is for the morning part of the school day. Depending on individual teaching styles, the children spend the morning in the classroom in either group or individual work situations. All classroom interaction is conducted through total communication. Most of the time is devoted to language and communication, but depending on the age and skills of the class other academic areas such as science, social studies, and math will be included. The morning hours run from 8:00 to 12:00 with a 15 minute recess at 10:30 to 10:45. Lunch coincides with breakfast as far as the students eating family style at a large table with one houseparent. After the students finish lunch they return to the dormitory for recreation time either in the dorm play area or outside if the weather permits. School begins again at 1:00 p.m. Academics for the afternoon are not as intensive. Work then is usually more experiential (field trips, movies, etc.). School ends at 2:30 p.m. and the children return to the dormitory. There they will have play time or planned dorm activities until supper at 5:00. Depending on the skills of the respective house-parent the time may involve some educational activity although mostly it is a time of just child interaction and exercise type play. At 5:00 the children eat a family style dinner and return to the dorm for another period of play time and social involvement.

Bedtime is 8:00 p.m. with a half hour time period before, for preparation for bed, bathing, brushing teeth, etc. All students return home on weekends. The time spent at school is actually Sunday evening through Friday afternoon. The students carry their belongings back and forth by suitcase. Parents are responsible for the care of a child's clothing and preparation for the week.

Sample Day - Minneapolis Public School Program

Submitted by Ms. Jayne Nelson

KINDERGARTEN ALL-DAY SCHEDULE

Individual Speech Sessions			Group Activities
		8:15 - 8:50	Arrival and Structured Play
8:50 - 9:00	1	8:50 - 9:15	Greeting Group Speech (2 Groups)
9:00 - 9:10	1		Calendar Weather
		9:15 - 9:30	Auditory Training Rhythms
		9:30 - 10:00	Group Language News or Experience Story
10:00 - 10:10	1	10:00 - 10:15	Follow-up Activities for Language
		10:15 - 10:40	Milk and Rest
10:40 - 10:50	1	10:40 - 11:00	Reading Readiness (2 Groups)
10:50 - 11:00	1	11:00 - 11:25	Gross Motor Skills (MWF) Fine Motor Skills (TTH)
		11:25 - 12:00	Lunch Preparation and Lunch
12:00 - 12:10	1	12:00 - 12:30	Structured Play Creative Dramatics
		12:30 - 12:50	Rest
		12:50 - 1:10	Arithmetic Activities (MWF) Social Studies-Language Activities (TTH)
		1:10 - 1:30	Gym
		1:30 - 1:50	Group Speech (2 Groups)
		1:50 - 2:10	Science Activities (MWF) Art (TTH)
		2:10 - 2:35	Finger Play Stories
		2:35 - 2:45	Prepare to Go Home Discuss or Review Work to Take Home

Sample Day - Minneapolis Public School Program

Submitted by Ms. Judith Masoner

M W F

8:30 - 9:45	Reading (split between 2 groups)
	Recess
10:00 - 10:15	Calendar and weather
10:15 - 11:00	Speech
	Lunch
12:15 - 12:40	Spelling
12:40 - 1:15	News
1:15 - 2:45	Liberal Arts Program (includes Art, Music, Shop, Gym and Home Economics)

W F

1:15 - 2:45

Spelling
(Interchangeable) Science
Informal Language

T Th

8:30 - 9:30	Reading (again split)
9:30 - 9:50	Music (geared toward HI)
	Recess
10:10 - 10:25	Calendar and weather
10:25 - 11:00	Language (formal)
11:00 - 11:40	Speech
12:15 - 1:15	Math (often split)

Sample Day - Hearing Impaired Program - Lyndale School

Submitted by Ms. Chris Painter

KINDERGARTEN INTEGRATION

Role of speech, language teacher of the deaf and supervisor of integration:

1. Speech and language therapy
    - a. Children seen daily for 10-15 minutes for individual assessment and programming.
    - b. Speech acquisition is emphasized according to child's capabilities and needs.
    - c. Language growth is facilitated relative to child's individual level of receptive and expressive language compentency.
2. Group language instruction relative to social studies curriculum
    - a. Children seen daily (20-30 minutes) for formal language instruction.
    - b. Emphasis on input for understanding new language concepts.
    - c. Expressive language encouraged between teacher ↔ child and child ↔ child.
3. Supervision of integration
    - a. Observation of behavior patterns in social situation; comparison of behavior in lg. group (integrated class) vs. small group (contained classroom for H.I.)
    - b. Evaluation of understanding of basic readiness skills relative to normal child.
    - c. Close observation of growth in area of social development.
    - d. Follow-up on concepts emphasized by integrated classroom teacher is done in individual speech/language sessions.
    - e. Some participation in unstructured play situations to encourage child to interact with many different children.
4. In addition, this role involves supervision of the parent - "training" program
    - a. Parents asked to observe child in both settings.
    - b. Suggestions given to parents for home - centered language stimulating experiences.

Sample Day - New Mexico School for the Deaf - Albuquerque Preschool

Submitted by Donna Groves, Supervising Teacher

The following is an outline for the 6 year old group:

9:00 - 10:00	Calendar work, News (writing original language about their own experiences), writing drill, speech work.
10:00 - 10:30	Recess
10:30 - 11:15	Open classroom
11:15 - 12:00	Math, structured language work.
12:00 - 1:00	Lunch
1:00 - 1:45	Reading
1:45 - 2:30	Auditory training, speech, finishing materials which had been started earlier in the day, individual work with a child who might be having difficulties in some area of academic work

OPEN CLASSROOM

The following centers were available to the children in the Open Classroom Area:

- Housekeeping Area and Dress-Up Clothes
- Wood Working Area
- Movie Area
  - Loop Films on Visual Perception and Speech Reading Activities
- Library Area
- Game Area
- Science Center
  - Growing of plants, animals, use of magnifying glass and magnets, discovering what objects will float in water and which will sink, temperatures and how they effect us, etc.
- Teaching Machine Area
  - To help reinforce vocabulary.

Sample Day - New Mexico School for the Deaf, Albuquerque Preschool

Submitted by Donna Groves, Supervising Teacher

The children included in the study were provided academic subjects in the classroom situations and "free play" experiences in the Open Classroom situation.

The Academic Subjects included: Auditory Training, Speech, Speechreading, Fingerspelling, Signs, Writing, Numbers, Reading, Language, Sense Training Activities, and Spelling.

How and when this material was presented to the class was left primarily to each teacher's own schedule. The time when each class went to the Open Classroom situation was set for the school year.

The following is an outline for the 5 year old group:

9:00 - 10:00	Spelling, structured language work, Show-and-Tell Writing.
10:00 - 10:30	Recess
10:30 - 11:45	On various days of the week the following materials were presented to the class: Auditory Training, Speech, Speechreading of Vocabulary, Sequencing stories, letters, numbers, workbook activities, etc.
11:45 - 12:00	Reading. Pre-primer and corresponding materials are presented: question forms, workbook activities, acting out stories, reading to each other, etc.
12:00 - 1:00	Lunch
1:00 - 1:45	Original News - language. Language Principles: Prepositions, Adjectives, Verbs. One day a week was spent on Sense Training Activities.
1:45 - 2:30	Open Classroom

Unit Center

Directed work by the teacher on building vocabulary through spelling. Units covered: Transposition, Verbs, Adjectives, Prepositions, Clothing, Months of the Year, Animals, etc.

Grocery Store

Needless to say, all these Areas were not presented at the first of the school year. As the children learned to handle several areas a new one would be opened to them.

Sample Day - New Mexico School for the Deaf - Santa Fe

Submitted by Ms. Roz. Bradford

SCHEDULE 1973-74

Seven to nine year old children

8:30 - 9:00	MORNING CONVERSATION - CALENDAR - NEWS News is written by the children only when unusual events occur. Sometimes teacher writes news to introduce new vocabulary or language structure. SPEECH WORK - Formal speech lessons are developed with the whole group (6) at other times, while some of the children are writing their news.
9:00 - 9:30	LANGUAGE - Unit work on vocabulary or new words which have come up incidentally or are due to come up in our reading lesson.
9:30 - 10:00	MATH - Test Book Orientated
10:05 - 10:30	MILK and RECESS
10:30 - 11:15	READING - We read as a group from the reader or other materials; there is much discussion, some written activity such as questions on the story, or other exercises to test the children's comprehension.
11:20 - 12:10	LANGUAGE - Connected language work, or introduction of language principles and structure.
12:10 - 1:10	LUNCH -
1:10 - 1:45	SCIENCE - Xerox Science Kit
1:45 - 2:05	SOCIAL STUDIES - Test Book, map work, discussions centered around holidays, etc. This may include written work.

Sample Day - Rochester School for the Deaf

Submitted by Mrs. Lorrie Holcomb

Preparatory Department Program

1973-1974

Pupil Level: Pre-primary - 6-7 years

1. Greeting: To encourage flexibility and imagination in greetings, the children respond in a variety of ways to:

   "How are you today?"

   i.e., "I'm happy because it is finally warm outside."

2. Calendar: Days are discussed mainly to emphasize:
   - change in tense
   - anticipation of future events

3. News: Children tell their news orally in good language and then write the sentences at the board and/or on paper. Special attention is given to pronoun referral and identification of Key concepts.

4. Mathematics: Recognition, separation and joining of sets, as well as concepts of comparison are emphasized in drills and games.

5. Reading: Activities center around books based on experiences and children's literature. Comprehension of sentences is determined through question work and pictures.

6. Language: Fitzgerald Key as well as natural language is taught with the children learning to use Key concepts in sentence patterns to guarantee straight language.

   1. Who: Verb: How many: What:
   2. Who: Verb: How many: What color: What:
   3. Who: Verb: How many: What kind: What:
   4. Who: Verb: Whose: What:
   5. Who: Verb:
      What:
   6. Who: Verb: Where:
      What:

7. Speech and hearing: Both individual and group instruction daily centers around
   - mastery of speech sounds
   - phrasing and rhythmic patterns
   - intonation and pitch
   - discrimination of sound, voice, pitch and syllables

8. Science and experiential activities

   Science experiments are conducted on:
   - the role of the five senses
   - objects and water: measurement, flotation, etc.
   - plant life

   Mental development through:
   - Life thinking activities
   - Memory and imagination games; Piaget
   - Emotions and situations which affect them

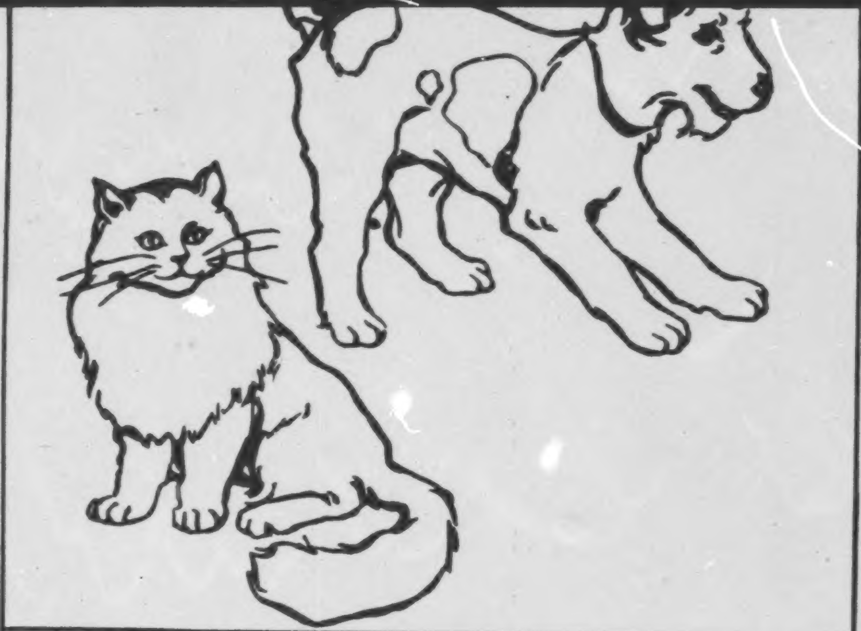
   One type of art, crafts or cooking activities is conducted each day.

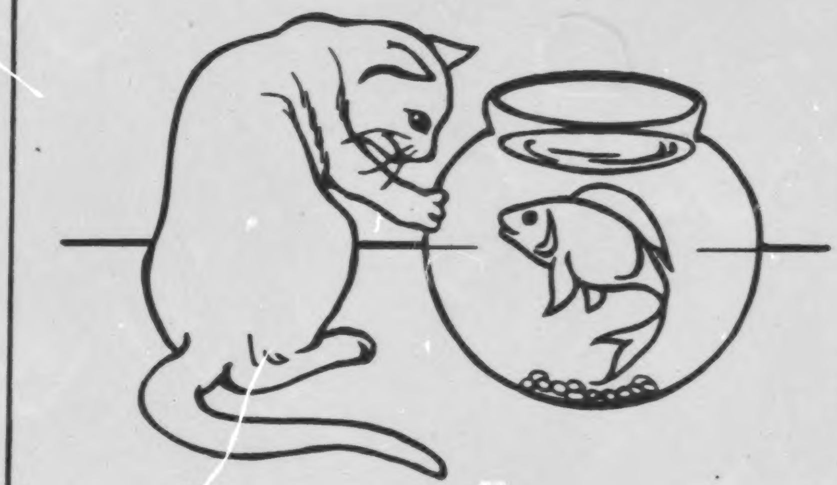
9. Special activities
   - Rhythm for sound, pattern and pitch discrimination
   - Dance for coordination and body awareness

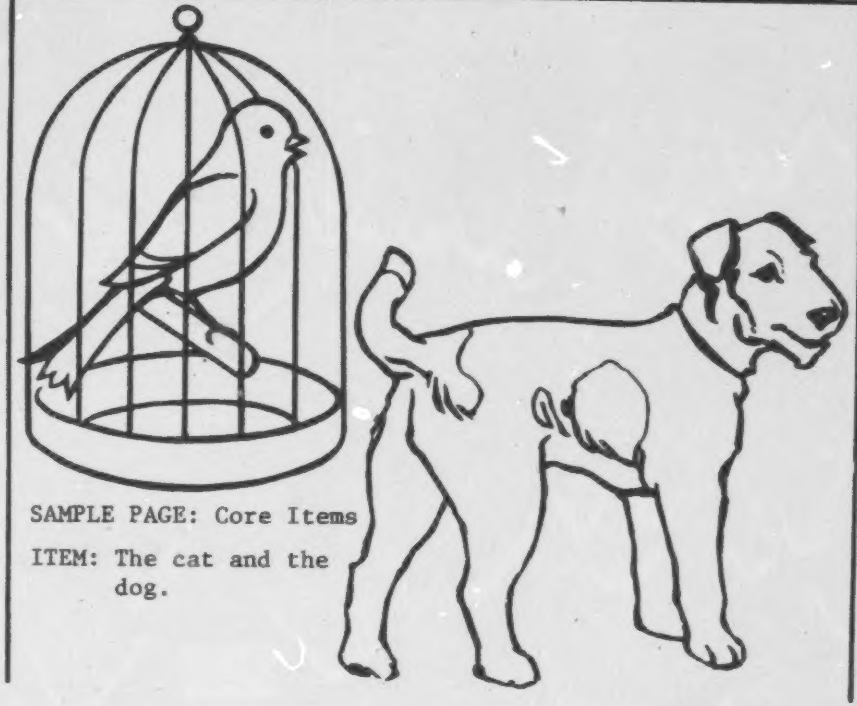
APPENDIX B

Sample pages

Receptive Communication Scale

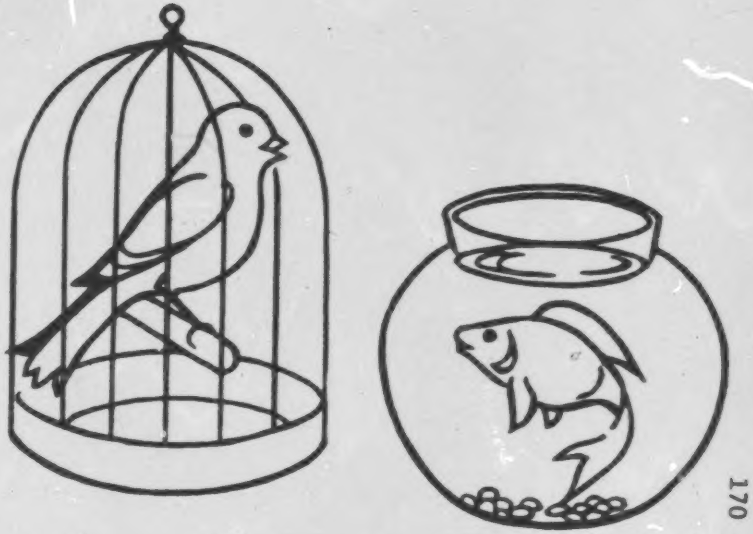






SAMPLE PAGE: Core Items

ITEM: The cat and the dog.



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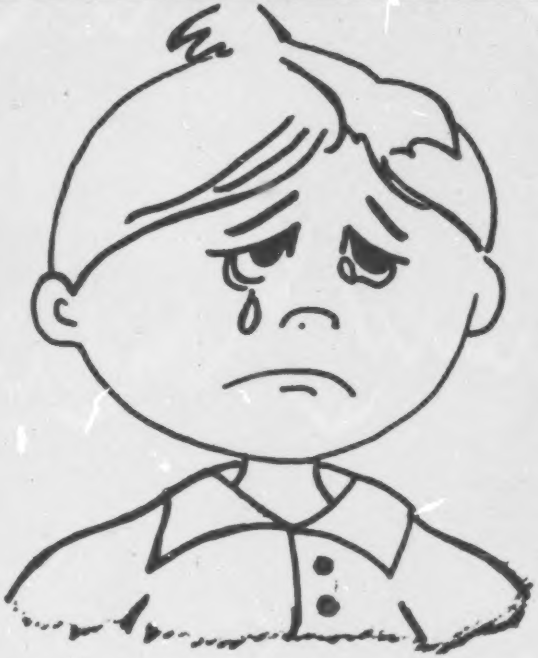
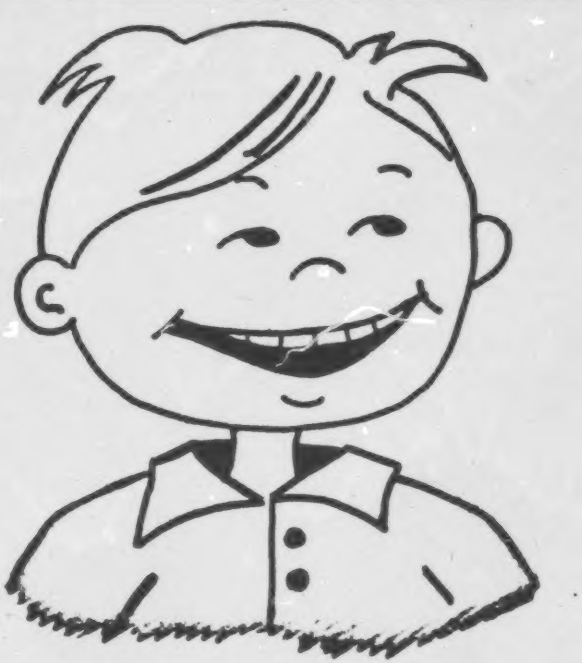
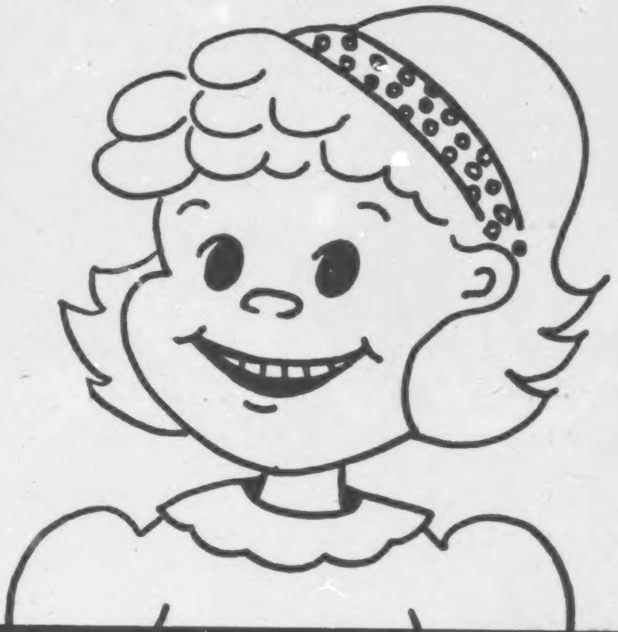
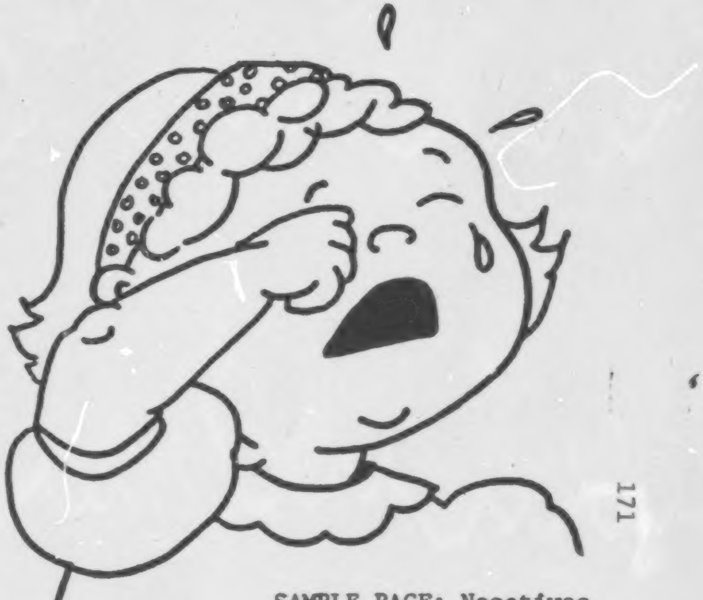
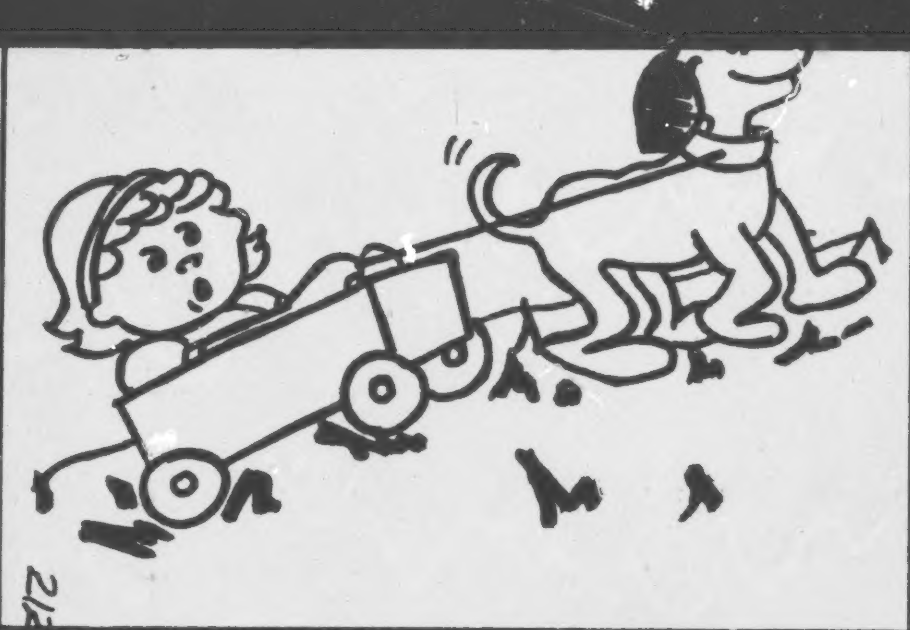


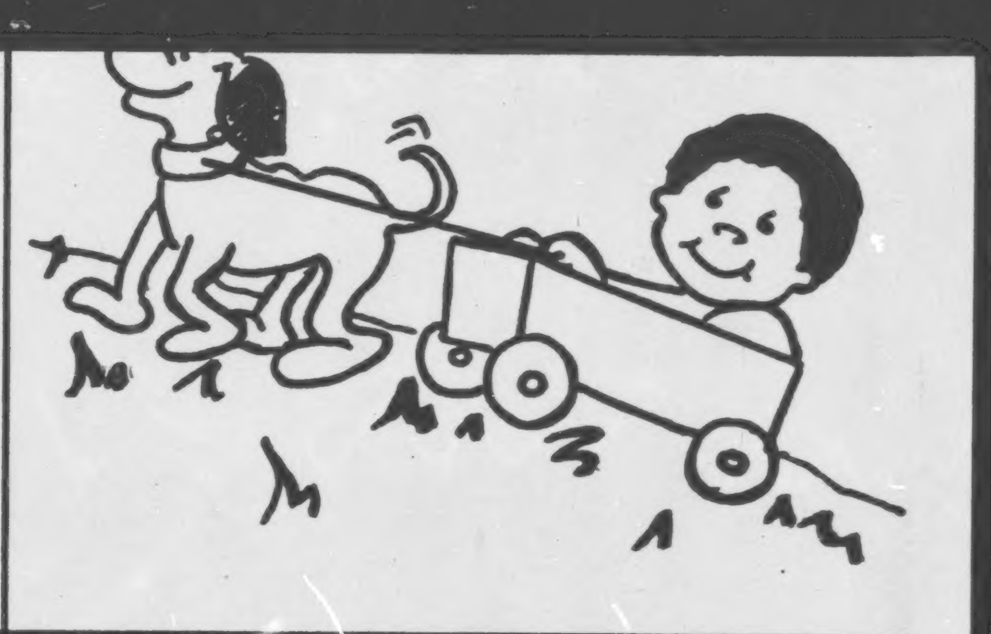






SAMPLE PAGE: Negatives





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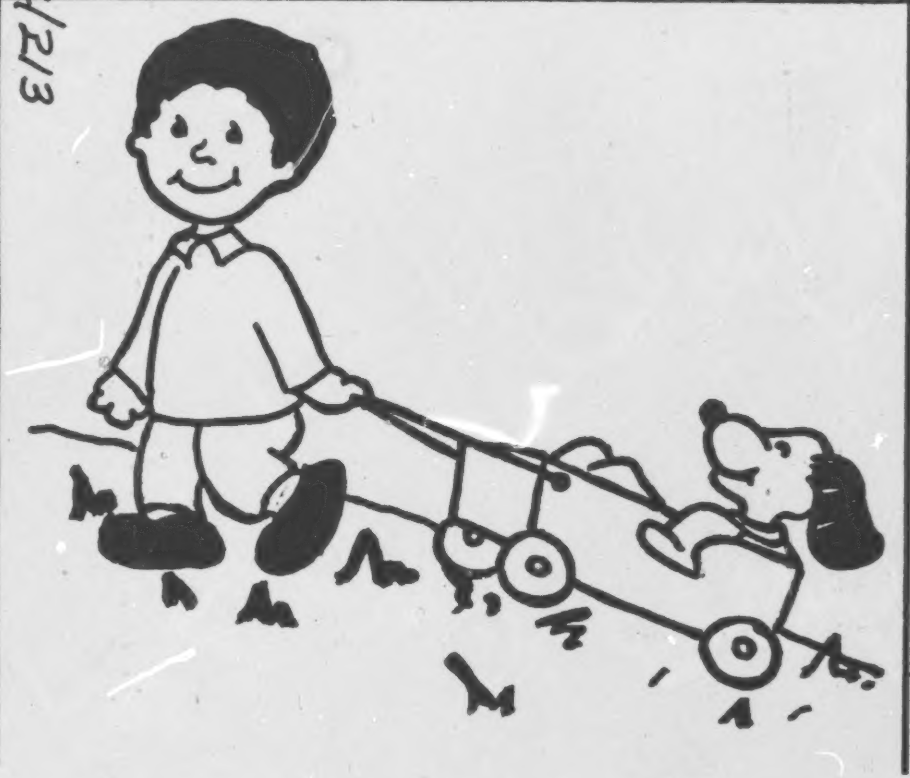
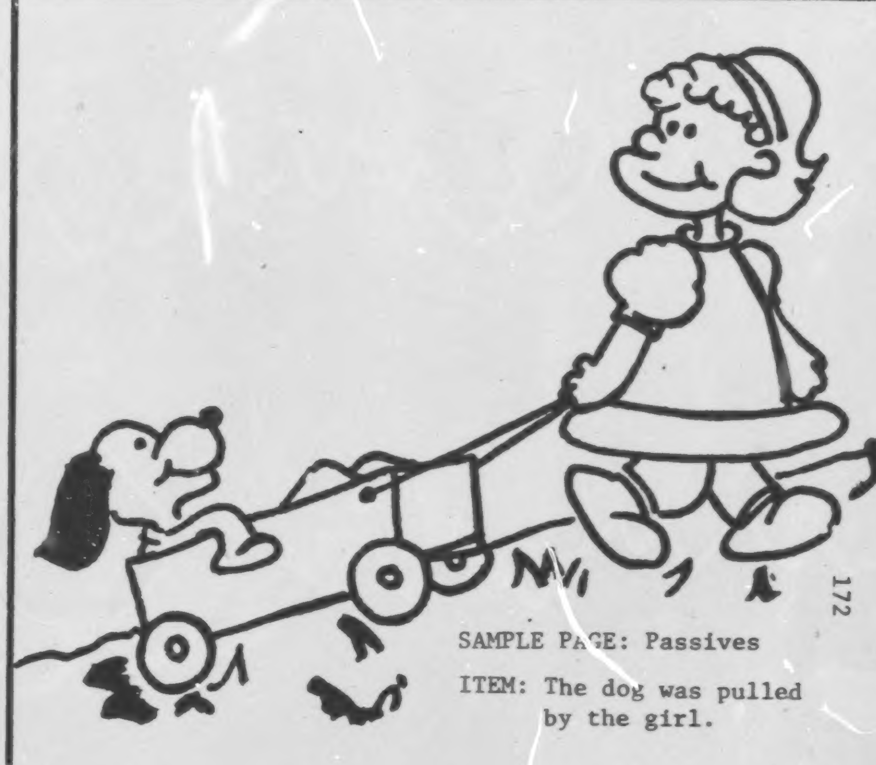
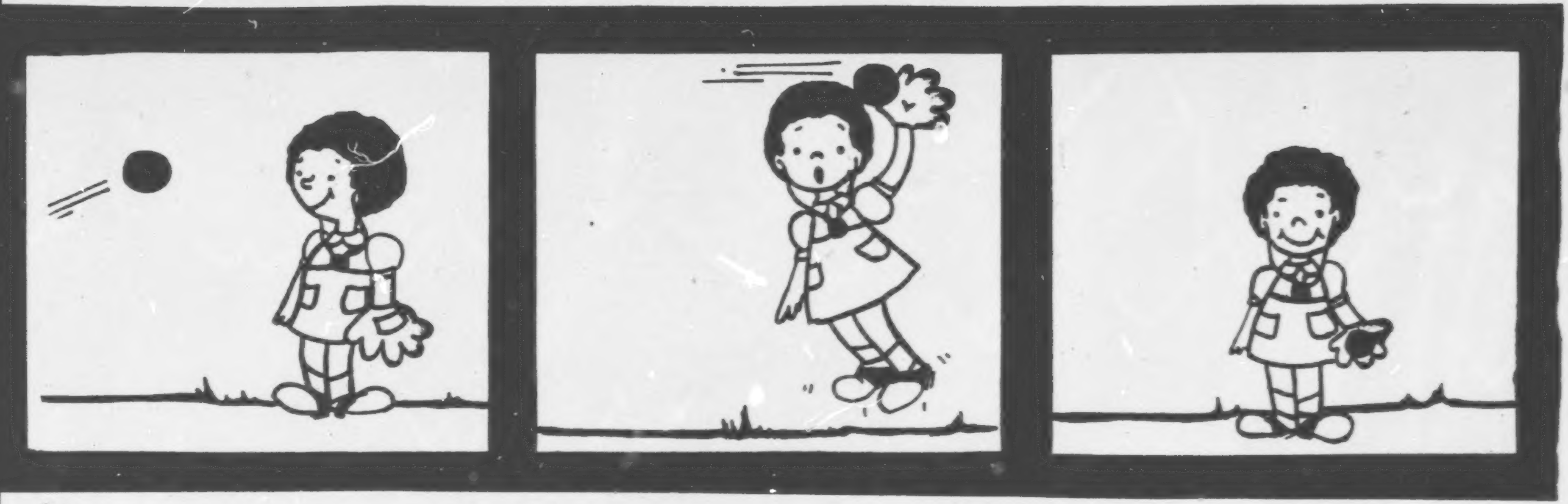




SAMPLE PAGE: Passives

ITEM: The dog was pulled
by the girl.



SAMPLE PAGE: Verb Tense

ITEM: The girl caught the ball.

(Illustration reduced to 60% of actual size)

RECEPTIVE COMMUNICATION SCALE
(Sample Scoring Sheet)

NAME:_________________________________ DATE:________________________

SCHOOL:________________________________ AID:___________

			YES		NO
1.	1 Table	A	B	C	D
2.	The boy is not walking.	A	B	C	D
3.	The red ball	A	B	C	D
4.	The bird is over the tree.	A	B	C	D
5.	The dog was splashed by the boy.	A	B	C	D
6.	The nose and the mouth.	A	B	C	D
7.	The man is washing.	A	B	C	D
8.	The boy was pushed by the girl.	A	B	C	D
9.	The boy is outside the house.	A	B	C	D
10.	4 hats	A	B	C	D
11.	The boy is jumping.	A	B	C	D
12.	The mother and the telephone.	A	B	C	D
13.	The boy is not laughing.	A	B	C	D
14.	The purple flower.	A	B	C	D
15.	The girl is not crying.	A	B	C	D
16.	The brown boat	A	B	C	D
17.	The girl is running.	A	B	C	D
18.	The apple is on the table.	A	B	C	D
19.	3 shoes	A	B	C	D
20.	The dog was pulled by the girl.	A	B	C	D
21.	The rabbit and the pig.	A	B	C	D
22.	The milk and the cookie.	A	B	C	D
23.	5 chairs	A	B	C	D
24.	The yellow cup	A	B	C	D
25.	The woman is not sitting.	A	B	C	D
26.	The baby is sleeping.	A	B	C	D
27.	The cat is under the chair.	A	B	C	D
28.	The boy was kicked by the horse.	A	B	C	D
29.	The woman is eating.	A	B	C	D
30.	The boy was hit by the girl.	A	B	C	D
31.	The cat and the dog.	A	B	C	D
32.	The green airplane.	A	B	C	D
33.	The baby is in the bed.	A	B	C	D
34.	2 books	A	B	C	D
35.	The man is not sleeping.	A	B	C	D

RECEPTIVE COMMUNICATION SCALE

VERBS

NAME:______________________ DATE:______________________

SCHOOL:______________________ AID:__________YES NO

1. The woman opened the door. A B C
2. The girl is spilling the milk. A B C
3. The girl will eat. A B C

4. The boy will jump. A B C
5. The man is working. A B C
6. The girl caught the ball. A B C

7. The girl will sit. A B C
8. The girl climbed the tree. A B C
9. The boy is pulling the wagon. A B C

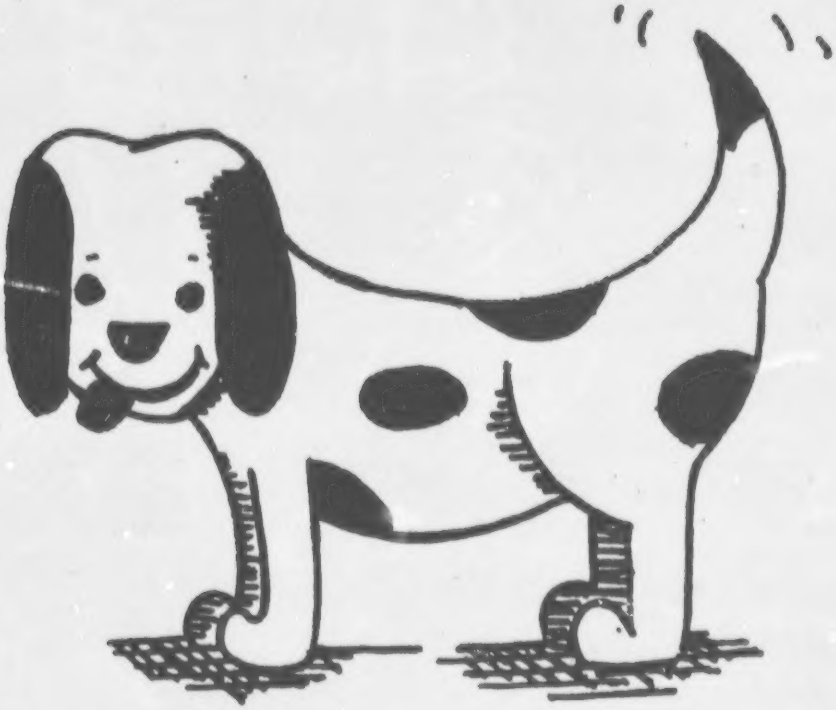
10. The woman is washing. A B C
11. The girl will push the boy. A B C
12. The boy fell. A B C

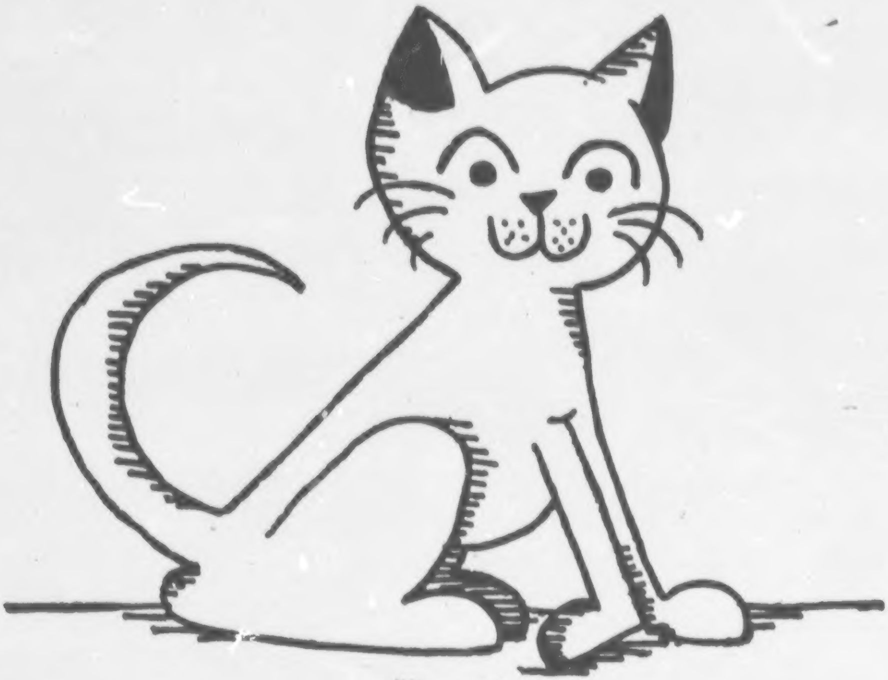
13. The girl is throwing the airplane. A B C
14. The boy will drop the ice cream. A B C
15. The boy carried the dog. A B C

APPENDIX C

Sample Stimuli

Articulation Test





Appendix C

Articulation Test - Raters' Word List

AIRPLANE
APPLE
BED
BIRD
BLUE
BOAT
BOOK
CAT
CUP
DISH
DOG
DOOR
EYE
FISH
FIVE
HAT
MAN
MILK
PIE
PIG
POP
RED
SHOE
TOP
TWO

APPENDIX D

Classroom Observation Schedule

Classroom Observation (Revised)

cher: ______________________ Observer: ______________________

rict ______________________ Date: __________ Time Start ______ Time Finish ______

of Children ______________________ Supporting Staff ______________________

LY PROGRAM

ed below are a number of activities that may be included in the daily program of kindergarten class. Indicate by number the sequence of activities in the session rved and the amount of time spent on each. Add activities not listed in spaces ided.

r Activity	Minutes	Order	Activity	Minutes	Order	Activity	Minutes
F.S. expr.							
F.S. rec.							
Signing expr.							
Signing rec.							
Writing							
Speech							
Lipreading							
Auditory Trng.							
Reading Readiness							
Number Work							
Free play							
Role Taking							
Date & weather check							
Group Discussion							
Story time							
Toileting							
Snack							
Rest period							

EQUIPMENT AND MATERIALS

Listed below are materials and equipment that may be found in a pre-kindergarten classroom. Check those seen in this classroom (x) and double check those used during the observation period (xx). Add items not listed in the spaces provided.

____ Large blocks

____ Small unit blocks

____ Books

____ Record player, tape recorder

____ Paints

____ Crayons

____ Pencils

____ Feltpens

____ Play dough

____ Clay

____ Scissors

____ Housekeeping corner

____ Dress-up clothes

____ Pupil name cards

____ Jungle gym, climbing ladder

____ Carpentry bench

____ Water play utinsils

____ Rhythm band instruments

____ Puppets

____ Wheel toys

____ Readiness workbooks

____ Readiness materials

____ Ditto masters

____ AV projectors

____ Overhead projector

____ Auditory unit

____ Audiograms

____ Pupil records

____ Color charts

____ Labels

____ Picture puzzles

____ Lotto games

____ Flannel board

____ Plants

____ Live animals

____ Manipulative toys

____ Northampton Chart

____ Fitzgerald Key

____ ______________

____ ______________

____ ______________

____ ______________

COMMUNICATION ANALYSIS

	Child to Child	Child to Teacher	Teacher to Child
Finger-Spelling	1 2 3 4 5 6 7*	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Sign-language	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Oral-Aural	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Combined	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Written	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Gestures	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7

* 1 - 7
Never to Frequently

	Child to Aide	Aide to Child
Finger-Spelling	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Sign-Language	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Oral-Aural	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Combined	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Written	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Gentures	1 2 3 4 5 6 7	1 2 3 4 5 6 7

Never to Frequently

CLASSROOM ORGANIZATION

1. Teacher plans activities for the group as a whole. - - - - - 1 2 3 4 5 6 7
2. Teacher singles out individual children for: tutoring - - - - 1 2 3 4 5 6 7
3. supporting - 1 2 3 4 5 6 7
4. Teacher shifts the organizational pattern (individual - small groups - entire group) according to the activity. - - - - - - - - - - - - - - - - - - 1 2 3 4 5 6 7
5. Teacher shifts the organizational pattern (individual - small groups - entire group) according to the needs of the children. - - - - - - - - - - - - 1 2 3 4 5 6 7
6. Spontaneous, independent work by the children does occur. - - 1 2 3 4 5 6 7
7. Spontaneous independent work by the children is allowed. - - 1 2 3 4 5 6 7
8. The program gives an impression of good planning. - - - - - - 1 2 3 4 5 6 7
9. The program appears to be well executed. - - - - - - - - - - - 1 2 3 4 5 6 7

USE OF SUPPORTING STAFF

10. Supporting Staff works in a supportive manner. - - - - - - - - 1 2 3 4 5 6 7
11. Supporting Staff performs housekeeping functions. - - - - - - - 1 2 3 4 5 6 7
12. Supporting Staff assists in maintaining discipline. - - - - - - 1 2 3 4 5 6 7
13. Supporting Staff prepares teaching materials. - - - - - - - - - 1 2 3 4 5 6 7
14. Supporting Staff has responsibility for special portions of the educational program. - - - - - - - - - - - - - - - - - - 1 2 3 4 5 6 7
15. Teacher and Supporting Staff function as a team, shifting responsibilities according to the needs of the children. - - 1 2 3 4 5 6 7

DISCIPLINE & CLASSROOM RELATIONSHIPS

*16. Teacher admonishes the children for misbehavior. - - - - - - 7 6 5 4 3 2 1

*17. Teacher threatens and cajoles. - - - - - - - - - - - - - - - - - 7 6 5 4 3 2 1

*18. Teacher controls through reiteration of the expectations of "good" and "grown-up" boys and girls. - - - - - - - - - - - - 7 6 5 4 3 2 1

Never to Frequently

Never to Frequently

19. Conforming behavior is rewarded. - - - - - - - - - - - - - - - 1 2 3 4 5 6 7

20. Teacher avoids problems by changing the pace of the program.- 1 2 3 4 5 6 7

21. Teacher quickly reprimands those who depart from the group pattern. - 1 2 3 4 5 6 7

22. The children cooperate readily. - - - - - - - - - - - - - - - - 1 2 3 4 5 6 7

*23. A laissez-faire attitude prevails in the classroom. - - - - - 7 6 5 4 3 2 1

24. Teacher places restrictions on the childrens behavior. - - - 1 2 3 4 5 6 7

STRUCTURING PROGRAM

25. Teacher emphasizes diverse experiences for general enrichment.1 2 3 4 5 6 7

26. Children's activities have discernable objectives related to apparent needs - 1 2 3 4 5 6 7

27. Teacher relies primarily on children's responses to determine her teaching goal at a given time. - - - - - - - - - - - - - 1 2 3 4 5 6 7

28. Teacher evidenced specific instructional goals. - - - - - - - - 1 2 3 4 5 6 7

29. Teacher focuses attention on the objectives:
Through defining the time period of the activity. - - - - - - 1 2 3 4 5 6 7

30. Through the use of special materials. - - - - - - - - - - - - - 1 2 3 4 5 6 7

*31. Through prescribing the child's responses. - - - - - - - - - -7 6 5 4 3 2 1

32. Teacher utilizes both enriching experiences and instructional activities. - - - - - - - - - - - - - - - - - - - 1 2 3 4 5 6 7

ENCOURAGING LANGUAGE AND SPEECH DEVELOPMENT

33. Teacher takes advantage of spontaneous language learning opportunities. - 1 2 3 4 5 6 7

34. Teacher makes provisions for language development:
Through discussions, question and answer period. - - - - - - 1 2 3 4 5 6 7

35. Through planned exposure to concepts. - - - - - - - - - - - - - 1 2 3 4 5 6 7

36. Teacher gives the child controlled practice in the use of selected terms and concepts in order to establish specified language patterns. - 1 2 3 4 5 6 7

Never to Frequently

Never to Frequently

REACTING TO PUPIL NEEDS

37. In planning and carrying out the program, teacher takes into account: The developmental status of the children. - - - - 1 2 3 4 5 6 7

38. The children's particular impairments. - - - - - - - - - - - - - - - 1 2 3 4 5 6 7

39. Teacher modifies her behavior to the childrens' needs and reacts: In small groups - 1 2 3 4 5 6 7

40. Entire group - 1 2 3 4 5 6 7

41. Individually - 1 2 3 4 5 6 7

42. Teacher uses his capacity to receive childrens communications. - 1 2 3 4 5 6 7

*43. Teacher domineers - 1 2 3 4 5 6 7

Never to Frequently

APPENDIX E

Parent Information and Attitude Scale

PARENTAL INFORMATION AND ATTITUDE SCALE
FOR PARENTS OF HEARING IMPAIRED CHILDREN

Donald W. Brown, Ph.D.
Associate Professor
The Graduate School
Gallaudet College
Washington, D. C.

Name of organization or meeting at which you received this questionaire ____________

____

GENERAL INFORMATION

Part I.

Note: Please do not put your name or address on this form. All information will be treated confidentially and will be used only for purposes of scientific research.

1. Sex: Male _____ Female _____ 2. Year of birth _____ 3. Year of marriage _____

4. Living with spouse at spouse at present time. Yes _____ No _____

5. Married more than once. Yes _____ No _____

6. If married more than once, was previous marriage ended because of:
Death _____ Divorce _____ Other (please state) _____

7. Draw a circle around the number of years of schooling you have completed.

12345678	1 2 3 4	1 2 3 4	1 2 3 4
Grade School	High School	College	Graduate Work

8. Religious affiliation:
______Protestant
______Roman Catholic
______Jewish
______Other
______None

9. Present family income (annual)

__________ under $3,000
__________ 3,000 to 4,999
__________ 5,000 to 6,999
__________ 7,000 to 8,999
__________ 9,000 to 10,999
__________11,000 to 14,999
__________15,000 or over

10. Husband's occupation (Be specific such as Drug Store Clerk, College Professor, Automobile Mechanic, etc.) ______________________________

11. Wife's occupation ______________________________
Full time ______ Part time ____

Note: In the following questions the child referred to is always your hearing impaired child.

12. Child's position in the family (1st born, 2nd, etc.) ______________

13. Child's birthdate ______________ Age ______________

14. Age of child when hearing loss occured ____________ was diagnosed _______

15. How many physicians or specialists did you visit before hearing loss was identified ____________

16. Degree of child's hearing loss: Profound ______ Severe ______ Moderate ______
Mild ______ Average loss for speech frequencies (if known)
Right ear _____ dB Left ear ______ dB
Deaf _________ Hard of Hearing __________

17. To whom did you originally go when you suspected a hearing loss:
Pediatrician ____________ Otologist ____________
General Practitioner ___________ Hearing Aid Dealer ____________
Audiologist ____________ Speech & Hearing Center ___________
Friend or relative ____________ Other ___________

18. What diagnoses other than hearing loss were given; e.g. mental retardation, "slow development" ________________________________
By whom ________________________________

19. Who gave the diagnosis of hearing impairment? ____________________

20. Are any members of Wife's family deaf or hard of hearing (Do not include elderly relatives who lost hearing late in life)
Yes __________ State relationship ______________________ No __________

21. Are any members of Husband's family deaf or hard of hearing
Yes __________ State relationship ______________________ No __________

22. When you were a youngster did you know any deaf children or adults?
Yes _______ No ________

23. During any part of your life have you known a deaf person? Yes ______ No ____
If Yes, give name(s) ________________________________

24. Prior to the discovery of your child's hearing loss had you ever seen a magazine or journal about deaf children or adults? Yes _______ No _________
If Yes, give name(s) ________________________________

25. Since learning of your child's impairment have you read any of the following:
(Please check those which you have read)
______ American Annals of the Deaf
______ Deaf American (Silent Worker)
______ Exceptional Children
______ Books Specify title(s) ______________________
______ Teacher of the Deaf
______ Volta Review
______ Other

26. Do you subscribe to any of the above periodicals? Yes _______ No ________
If Yes, give name(s) and length of time during which you have subscribed.
____

NOTE: The following questions assume that your child is presently enrolled in a program for the hearing impaired. If this is not the case, answer the questions in terms of the program your child will be entering.

27. At what age did your child begin his education as a hearing impaired child

____.

28. Have you ever visited a school or class for hearing impaired children other than the one in which your child is enrolled? Yes __________ No __________
If Yes, please give name(s) ____________________________________
Age level(s) of class(es) visited ________________________________

29. Please give the names of at least three other schools, classes, or programs (in this state) that your child could have been enrolled in if you had not chosen the one he is presently attending ______________________
____
____

30. How did you first hear about the program your child is attending?
____
____

31. Did anyone encourage you to send your child to his present school?
Yes ____ No ____ If Yes, state relationship of the person(s)__________
____

32. Have you visited your child's classroom? Yes ____ No ____ If Yes, approximately how many times ______________________________________

33. Has anyone suggested that you enroll your child in a program other than the one he is attending? Yes ____ No ____ If Yes, what was the relationship of that person to you and what type of program(s) did he (she) suggest? __________
____
____

34. Would you please rate the amount of confidence you have that you made the correct decision in placing your child in the program he is now attending:
__________ Very confident
__________ Fairly confident
__________ Slight lack of confidence
__________ Serious lack of confidence

35. Have you seen any television programs about deaf children or adults or with a deaf character? Yes ________ No ________

36. Which of the following conditions do you feel is the most educationally handicapped for a young child? (Check one)
________Deafness
________Blindness
__________Cerebral Palsy
__________Rheumatic Fever

37. What does the name Gallaudet mean to you? ____

____

38. Are you a member of the Alexander Graham Bell Association for the Deaf?
Yes ______ No ______

39. Do you belong to any association of parents of deaf or hard of hearing children?
Yes ______ No _____ If yes, give name(s) ________________________________

____

40. Have you ever known a deaf person who is a parent of deaf or hearing children?
Yes ______ No ______

YOUR CHILD THIRTY YEARS FROM NOW

Part II.

What will your child be doing thirty years from now? Knowing your child, you may be able to make some good guesses. Place an (X) in the column which indicates the degree of chance you feel there is that the statement will be a true description of your child thirty years from now. If you and your spouse disagree, give both answers and place an (H) after husband's choice and (W) for wife's.

	Very good chance	Fairly good chance	Some chance	A little chance	No chance at all
1. Will be a college graduate					
2. Will have speech that is easily understood by most people					
3. Will read at about fifth or sixth grade level or below					
4. Will use sign language as his preferred means of communication					
5. Will have more deaf friends than hearing friends					
6. Will be active in PTA, Rotary, Kiwanis or other similar organizations					
7. Will know his neighbors well					
8. Will be thought of as having normal hearing by people who meet him					
9. Will have graduated from a regular high school					
10. Will drive a car					
11. Will depend on speech reading more than on his hearing					
12. Will be married to a person with normal hearing					
13. Will be employed in a semi-skilled or skilled job rather than a profession					
14. Will be close to his brothers and sisters					
15. Will have difficulty in using English correctly					
16. Will be in good health					
17. Will use both oral and manual communication					
18. Will keep in touch with me					
19. Will belong to organizations of deaf and hard of hearing					

Part III.

Many statements and opinions have been expressed about hearing handicapped people. We are interested in learning the reactions that you, as the parent of a hearing impaired child, would have to the following statements. Please read each statement carefully. Circle the letter in front of the response which best expresses what you think of or would do about the statement.

In completing this form, please keep the following points in mind:

1. Everything you write will be kept confidential.
2. Try to circle one response for every question. (If you skip a statement, we will not know what you meant.)

1. Alexander Graham Bell, inventor of the telephone and strong supporter of teaching speech to deaf children, once said that finger spelling was the fastest and most efficient wqy to teach language to deaf children
    - a. I think he was probably right
    - b. I find it difficult to believe that he ever said that
    - c. He meant this only for retarded or slow learning deaf children
    - d. This is interesting but probably needs some research to prove it or disprove it
    - e. Such a statement proves that he never truly believed in the importance of speech

2. Stuckless and Birch (University of Pittsburgh) report that their study has indicated that manual communication (sign language and finger spelling) does not hinder the development of speech in young deaf child
    - a. I'd like to get the opinion of the principal of my child's school on that
    - b. This is reassuring because I've wondered about that
    - c. They probably didn't do a very careful study
    - d. They mean that this is true if the child has already developed speech before he is exposed to manual communication
    - e. This sounds like propaganda to me

3. There is so much disagreement about education of the deaf that the best thing to do is:
    - a. Be sure I've picked the best school and then get information from that school's staff
    - b. Read everything I can and then just trust that I've done the right thing
    - c. Find out what approach has the most supporters and try that first
    - d. Realize that what seems to be best for others may not be best for my child
    - e. Read everything I can and then get the opinion of a school principal or superintendent

4. Some people have said that many fewer deaf people than hearing people are able to go to college
    - a. This is probably true because of the deaf child's difficulty in learning
    - b. This is only true if the deaf child gets the wrong elementary education
    - c. Colleges shouldn't be allowed to discriminate against the deaf that way
    - d. These people are talking about previous generations and are unaware of current progress
    - e. This seems quite logical to me

5. Alexander Graham Bell said, "I think the use of the sign language will go out of existance very soon".

    a. This has happened
    b. This statement just shows how wrong Bell could be
    c. This will happen soon because of our better teaching methods
    d. Bell would never have said that
    e. This is why it is unnecessary for my children to learn signs

6. Most deaf people marry a deaf person

    a. This is not true
    b. If this is true, it is because of the communication barrier imposed by deafness
    c. This is true only if the deaf have been segregated from contact with hearing people
    d. This is fine if it's what the deaf want
    e. This will not be true of my child because we're treating him as a normal person

7. If a friend of mine discovered that her child was deaf

    a. I'd tell her about the school my child is in
    b. I'd suggest some things she should read about the different types of programs
    c. I would sympathize with her but not interfere with her right to make her own decision
    d. I'd try to get to her before people filled her with wrong information
    e. I would feel obligated to share with her the satisfaction I have now that I've found the right program

8. It is reported that many deaf adults who do not have intelligible speech are successfully employed and well adjusted.

    a. There are rare exceptions
    b. This does not surprise me
    c. They would be even more successful if they could speak
    d. I don't think this is true
    e. Statements like this should not be made as they will discourage parents from teaching their child to talk

. An oral teacher of the deaf claims that many deaf children can't learn to speak and lipread.

    a. The statement is false and I can't believe a teacher would say that
    b. She probably doesn't know the methods used at my child's school
    c. That's true - she means retarded and visually handicapped deaf children
    d. She shouldn't be allowed to teach
    e. I agree - some can but many can't

10. One of the *disadvantages* of getting together with other parents whose children are in my child's school is:

a. I know what they think - I want to hear the other side
b. No one of us has the same problems as another parent
c. There are *no* disadvantages
d. It requires time away from my own family
e. We might support each other's mistakes

11. A deaf adult says that he and his deaf friends don't think speech is very important.

a. He and his friends probably have poor speech - sour grapes
b. I can't imagine anyone, deaf or hearing, saying that
c. Possibly he and his friends have found satisfactory adjustment without speech
d. This is what can happen if a child is sent to the wrong type of school
e. This is an unfortunate but very common statement

12. We all have too little time. Because of this I should devote my short reading time to:

a. Books and articles whose authors know what they're talking about
b. Topics other than deafness because I have faith in my child's school
c. Learning about methods of teaching the deaf which I disagree with
d. Controversial articles - so I can defend the correct approach
e. Books on manual communication so I can get to know my child better

13. Most deaf people prefer to associate with other deaf people rather than hearing people.

a. This is not true
b. This will not be true of my child if I raise him right
c. I imagine this is true - they understand each other's speech easier
d. This is why deaf children should be taught with regular children
e. If they are happy doing this - that's fine

14. The primary function of an educational program of hearing impaired children is to:

a. Provide short term help which will enable the child to enter a regular school with hearing children
b. Teach the children to hear better
c. Develop speech and speechreading skills
d. Provide appropriate instruction in academic skills, i.e., reading, language, writing
e. Present opportunities for association with hearing children

APPENDIX F

Parent Check List

University of Minnesota
Research and Development Center
Donald F. Moores, Ph.D.

We are interested in evaluating ways in which people react to different words. On each page there is a different word to be judged by a number of pairs of adjectives. You should make a judgment for every adjective pair.

If you feel the word is very close to one end, you should mark your paper like this:

bad __X__ : _____ : _____ : _____ : _____ : _____ : _____ : good

or

bad _____ : _____ : _____ : _____ : _____ : _____ : __X__ : good

If you feel the word is close to one end but not extremely so, you should mark your paper like this:

strong _____ : __X__ : _____ : _____ : _____ : _____ : _____ : weak

or

strong _____ : _____ : _____ : _____ : _____ : __X__ : _____ : weak

If you feel the word is a little bit related to one adjective, you should mark your paper like this:

fast _____ : _____ : __X__ : _____ : _____ : _____ : _____ : slow

or

fast _____ : _____ : _____ : _____ : __X__ : _____ : _____ : slow

If you feel the word is not close to either adjective or that the adjectives make no sense with the word, you should mark your paper like this:

safe _____ : _____ : _____ : __X__ : _____ : _____ : _____ : dangerous

POINTS TO REMEMBER

1. RESPOND TO EVERY LINE, DO NOT SKIP ANY.
2. DON'T CHECK ANY LINE MORE THAN ONCE.
3. WORK QUICKLY.
4. DON'T LOOK BACK OR TRY TO REMEMBER HOW YOU RESPONDED TO OTHER WORDS.
5. BE SURE TO MAKE YOUR MARKS ON THE LINES.

THIS NOT THIS

______: ______: __X__: ______: ______: ______:X______: ______:

PRESCHOOL

good ______: ______: ______: ______: ______: ______: ______ bad

sad ______: ______: ______: ______: ______: ______: ______ happy

dirty ______: ______: ______: ______: ______: ______: ______ clean

nice ______: ______: ______: ______: ______: ______: ______ awful

fair ______: ______: ______: ______: ______: ______: ______ unfair

disabreable ______: ______: ______: ______: ______: ______: ______ agreable

valuable ______: ______: ______: ______: ______: ______: ______ worthless

boring ______: ______: ______: ______: ______: ______: ______ fun

productive ______: ______: ______: ______: ______: ______: ______ unproductive

useful ______: ______: ______: ______: ______: ______: ______ useless

harmful ______: ______: ______: ______: ______: ______: ______ beneficial

important ______: ______: ______: ______: ______: ______: ______ unimportant

SPEECH

good _______:_______:_______:_______:_______:_______:_______ bad

sad _______:_______:_______:_______:_______:_______:_______ happy

dirty _______:_______:_______:_______:_______:_______:_______ clean

nice _______:_______:_______:_______:_______:_______:_______ awful

fair _______:_______:_______:_______:_______:_______:_______ unfair

disagreable _______:_______:_______:_______:_______:_______:_______ agreable

valuable _______:_______:_______:_______:_______:_______:_______ worthless

boring _______:_______:_______:_______:_______:_______:_______ fun

productive _______:_______:_______:_______:_______:_______:_______ unproductive

useful _______:_______:_______:_______:_______:_______:_______ useless

harmful _______:_______:_______:_______:_______:_______:_______ beneficial

important _______:_______:_______:_______:_______:_______:_______ unimportant

INTEGRATION OF A DEAF CHILD INTO A HEARING CLASS

good ______:______:______:______:______:______:______ bad

sad ______:______:______:______:______:______:______ happy

dirty ______:______:______:______:______:______:______ clean

nice ______:______:______:______:______:______:______ awful

fair ______:______:______:______:______:______:______ unfair

disagreable ______:______:______:______:______:______:______ agreeable

valuable ______:______:______:______:______:______:______ worthless

boring ______:______:______:______:______:______:______ fun

productive ______:______:______:______:______:______:______ unproductive

useful ______:______:______:______:______:______:______ useless

harmful ______:______:______:______:______:______:______ beneficial

important ______:______:______:______:______:______:______ unimportant

SPEECHREADING--LIPREADING

good _______:_______:_______:_______:_______:_______:_______ **bad**

sad _______:_______:_______:_______:_______:_______:_______ **happy**

dirty _______:_______:_______:_______:_______:_______:_______ **clean**

nice _______:_______:_______:_______:_______:_______:_______ **awful**

fair _______:_______:_______:_______:_______:_______:_______ **unfair**

disagreable _______:_______:_______:_______:_______:_______:_______ **agreable**

valuable _______:_______:_______:_______:_______:_______:_______ **worthless**

boring _______:_______:_______:_______:_______:_______:_______ **fun**

productive _______:_______:_______:_______:_______:_______:_______ **unproductive**

useful _______:_______:_______:_______:_______:_______:_______ **useless**

harmful _______:_______:_______:_______:_______:_______:_______ **beneficial**

important _______:_______:_______:_______:_______:_______:_______ **unimportant**

HEARING AID

good _____: _____: _____: _____: _____: _____: _____ bad

sad _____: _____: _____: _____: _____: _____: _____ happy

dirty _____: _____: _____: _____: _____: _____: _____ clean

nice _____: _____: _____: _____: _____: _____: _____ awful

fair _____: _____: _____: _____: _____: _____: _____ unfair

disagreable _____: _____: _____: _____: _____: _____: _____ agreable

valuable _____: _____: _____: _____: _____: _____: _____ worthless

boring _____: _____: _____: _____: _____: _____: _____ fun

productive _____: _____: _____: _____: _____: _____: _____ unproductive

useful _____: _____: _____: _____: _____: _____: _____ useless

harmful _____: _____: _____: _____: _____: _____: _____ beneficial

important _____: _____: _____: _____: _____: _____: _____ unimportant

AUDITORY TRAINING

good ______:______:______:______:______:______:______ **bad**

sad ______:______:______:______:______:______:______ **happy**

dirty ______:______:______:______:______:______:______ **clean**

nice ______:______:______:______:______:______:______ **awful**

fair ______:______:______:______:______:______:______ **unfair**

disagreable ______:______:______:______:______:______:______ **agreable**

valuable ______:______:______:______:______:______:______ **worthless**

boring ______:______:______:______:______:______:______ **fun**

productive ______:______:______:______:______:______:______ **unproductive**

useful ______:______:______:______:______:______:______ **useless**

harmful ______:______:______:______:______:______:______ **beneficial**

important ______:______:______:______:______:______:______ **unimportant**

SIGNLANGUAGE

good ______:______:______:______:______:______:______ bad

sad ______:______:______:______:______:______:______ happy

dirty ______:______:______:______:______:______:______ clean

nice ______:______:______:______:______:______:______ awful

fair ______:______:______:______:______:______:______ unfair

disagreable ______:______:______:______:______:______:______ agreable

valuable ______:______:______:______:______:______:______ worthless

boring ______:______:______:______:______:______:______ fun

productive ______:______:______:______:______:______:______ unproductive

useful ______:______:______:______:______:______:______ useless

harmful ______:______:______:______:______:______:______ beneficial

important ______:______:______:______:______:______:______ unimportant

FINGERSPELLING

good ______:______:______:______:______:______:______ bad

sad ______:______:______:______:______:______:______ happy

dirty ______:______:______:______:______:______:______ clean

nice ______:______:______:______:______:______:______ awful

fair ______:______:______:______:______:______:______ unfair

disagreable ______:______:______:______:______:______:______ agreable

valuable ______:______:______:______:______:______:______ worthless

boring ______:______:______:______:______:______:______ fun

productive ______:______:______:______:______:______:______ unproductive

useful ______:______:______:______:______:______:______ useless

harmful ______:______:______:______:______:______:______ beneficial

important ______:______:______:______:______:______:______ unimportant

HEARING IMPAIRED

good ______:______:______:______:______:______:______ bad

sad ______:______:______:______:______:______:______ happy

dirty ______:______:______:______:______:______:______ clean

nice ______:______:______:______:______:______:______ awful

fair ______:______:______:______:______:______:______ unfair

disagreable ______:______:______:______:______:______:______ agreable

valuable ______:______:______:______:______:______:______ worthless

boring ______:______:______:______:______:______:______ fun

productive ______:______:______:______:______:______:______ unproductive

useful ______:______:______:______:______:______:______ useless

harmful ______:______:______:______:______:______:______ beneficial

important ______:______:______:______:______:______:______ unimportant

DEAFNESS

good ______:______:______:______:______:______:______ bad

sad ______:______:______:______:______:______:______ happy

dirty ______:______:______:______:______:______:______ clean

nice ______:______:______:______:______:______:______ awful

fair ______:______:______:______:______:______:______ unfair

disagreable ______:______:______:______:______:______:______ agreable

valuable ______:______:______:______:______:______:______ worthless

boring ______:______:______:______:______:______:______ fun

productive ______:______:______:______:______:______:______ unproductive

useful ______:______:______:______:______:______:______ useless

harmful ______:______:______:______:______:______:______ beneficial

important ______:______:______:______:______:______:______ unimportant

APPENDIX G

Longitudinal Test Data for Subjects with Unique Class Placement

Table

Child A

SEX: Male

ETIOLOGY: Menningitis

CA: 7 years 11 mos.

AGE OF ONSET: 2 years

HEARING LOSS: 95 db

Test Scores

	1971	1972	1973	1974
Letter IQ	107			
WISC Performance IQ				117
ITPA	164	191	172	174
Receptive Communication		40%	72%	40%
Articulation		32%	24%	15%
MRT			46	
MAT				42

Table

Child B

SEX: Male

ETIOLOGY: Unknown

CA: 6 years 3 months

AGE OF ONSET: 1 1/2 years

HEARING LOSS: 80 db

Test Scores

	1971	1972	1973	1974
Letter IQ	119			
WISC Performance IQ				107
ITPA	N.T.*	196	189	198
Receptive Communication		55%	88%	44%
Articulation		50%	84%	95%
MRT			36	
MAT				36

* Not Testable

Table

Child C

SEX: Female

ETIOLOGY: Rubella

CA: 6 years 5 months

AGE OF ONSET: Birth

HEARING LOSS: 78 db

Test Scores

	1971	1972	1973	1974
Letter IQ	124			
WISC Performance IQ				110
ITPA	199	N.T.*	183	166
Receptive Communication		N.T.	52%	63%
Articulation		N.T.	52%	88%
MRT			44	
MAT				42

* Not Testable

Table

Child D

SEX: Male

ETIOLOGY: Fever

CA: 7 years 10 months

AGE OF ONSET: 1/2 year

HEARING LOSS: 83 db

Test Scores

	1971	1972	1973	1974
Letter IQ	107			
WISC Performance IQ				115
ITPA	203	198	187	198
Receptive Communication		65%	62%	83%
Articulation		83%	62%	68%
MRT			37	
MAT				63

Table

Child E

SEX: Male

ETIOLOGY: Rubella

CA: 7 years 3 months

AGE OF ONSET: Birth

HEARING LOSS: 93 db

Test Scores

	1971	1972	1973	1974
Letter IQ				
WISC Performance IQ				115
ITPA			193	154
Receptive Communication			80	77
Articulation		85%	81%	87%
MRT			47	
MAT				60

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